

RAILROAD GAZETTE

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TWENTIETH YEAR.

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FRIDAY, MARCH 16, 1877.

CHICAGO: 77 Jackson St.

RAILWAY DISBURSEMENTS

And the Accounts into which they are Naturally Divided.

By MARSHALL M. KIRKMAN.
Embracing carefully worded instructions in the form of concise rules for the government of the various officials and agents in reporting to the accounting officer; the material disbursed in operations; the labor performed by the various departments; and the moneys expended on account of the company; and including copies of all the important blank forms required by employees in making the returns required of them. The rules have the great merit of simplicity, of directness and of comprehensiveness; they have the especially important merit of perfect practicality upon a road only a few miles in length, or one extending uninterruptedly across the continent. The most complete and exact rules for keeping railroad accounts ever published. Price \$2, postage paid. Published by the RAILROAD GAZETTE, 73 Broadway, New York.

GEORGE A. EVANS,
Bethlehem Steel Rails,
74 WALL STREET, N. Y.

RAILWAY SAFETY APPLIANCES.

INTER-LOCKING SYSTEM.

CAUTION.

Whereas, in the year 1856, Letters Patent were granted in England to John Saxby for his original invention of Locking Apparatus to prevent accidents at Junctions; and whereas the said John Saxby, together with John Stinson Farmer, trading under the style or firm of Saxby & Farmer, as Railway Signalling Engineers and Manufacturers, in London, England, are the sole proprietors of the said patent, as well as of several other English patents subsequently granted to them for improvements; and whereas they were the first to introduce the inter-locking system in America, and are now the sole proprietors of three several United States Patents granted to them for such improvements, as well as of a patent granted to John Ingham for further improvements; which patents are of number and date as follows, viz.:

United States Patent No. 80,878 August 11, 1868.
" " 131,788 October 1, 1872.
" " 192,416 " 22, 1872.
" " 169,811 Nov. 9, 1875, and

whereas of late various Signalling Apparatus have been advertised or made, which are infringements of the above or of some or one of the above-mentioned United States Patents.

All persons and companies are hereby cautioned against making, vending, or using any such Signalling Apparatus which are infringements of the before-mentioned patents or some or one of them; and notice is hereby given that they will be held responsible for any such infringements.

SAXBY & FARMER,
Railway Signalling Engineers.
LONDON, N. W.

RAILROAD GAZETTE DIRECTORY.

[This index to the advertisements in the RAILROAD GAZETTE is published in order that they may be more convenient and valuable to those who make use of them as a directory of railroad supplies and equipment. A number of advertisements appear only "every other week" or "once a month," in such cases, where the advertisement is not in the current number, a blank appears instead of the full opposite the name.]

Accounts: Cushman & Steele, 20 Nassau street, N. Y. 1	Air Brakes: Wm. Loughridge, Baltimore 1 Westinghouse Air-Brake Co., Pittsburgh 1	Axles: A. & P. Roberts & Co., Philadelphia 1 Wilson Walker & Co., Pittsburgh 1	Boiler Patches: J. F. Richards, Providence, R. I. 1	Boiler Rivets, etc.: Ropes & Townsend, Philadelphia 1	Bridges: American Bridge Co., Chicago 1 Baltimore Bridge Co., Baltimore 1 Cincinnati Bridge Co., Cincinnati 1 Clark, Reeves & Co., Philadelphia 1 J. H. Corbitt & Co., Philadelphia 1 Bellevue Bridge Co., 22 Wall street, N. Y. 1 Detroit Bridge & Iron Works, Detroit 1 Edgemoor Iron Co., Wilm. & 79 Liberty st., N. Y. 1 W. J. James & Co., Milwaukee, Wis. 1 K. & Hopkins & Co., St. Louis 1 King Iron Bridge & Manufacturing Co., Cleveland 1 Krytone Bridge Company, Philadelphia 1 Lehigh Valley Bridge & Iron Works, Rochester 1 Lowthry & Henderson, Trenton, N. J. 1 Louisville Bridge & Iron Co., Louisville 1 Nagara Bridge Works, Buffalo 1 Wrought Iron Bridge Co., Canton, O. 1	Bridge Boilers: Berkley & Gaylord, Cleveland 1	Cars: J. G. Brill & Sons, Manufacturing Co., Dayton, O. 1 Harris & Hollingsworth Co., Wilmington 1 J. H. Jones & Co., West Troy 1 Carriage & Coach Co., New York 1 Gardner Chilson, Boston 1	Car Wheels: Baltimore Car-Wheel Co., Baltimore 1 Barnum & Richardson, Manufacturing Co., Chicago 1 Covier, Maher & Braxton, Cleveland 1 John L. Gill, Columbus, O. 1 Hamilton Steel-Wheel Co., Philadelphia 1 Lambert Car-Wheel Co., Wilmington, Del. 1	Car-Wheel & Ry. Supply Co., Louisville 1 McKee & Fuller, Catasauqua, Pa. 1 Thomas May & Co., Indianapolis 1 Mowry Car & Wheel Co., Cincinnati 1 Ramapo Wheel & Foundry Co., Ramapo, N. Y. 1 Taylor Iron Works, High Bridge, N. J. 1 A. Whitney & Sons, Philadelphia 1 Cedar Tanks: Geo. J. Burkhardt, Philadelphia, Pa. 1	Checks: John Robbins, Boston 1	Civil Engineers: Clemens Herschel, Boston 1 W. J. Nicolls, Baltimore 1 R. E. Bicker & Co., New York 1 Wilson Bros. & Co., Philadelphia 1	Cordage: Ellisborth Steam Cordage Co., N. Y. 1	Cushioned Helve Hammers: Bradley Manufacturing Co., Syracuse 1	Drilling Machines: Thorne, DeHaven & Co., Philadelphia 1	Duplex Tickets: American Duplex Ticket Co., 260 Broadway, N. Y. 1	Employment: Zell, Davis & Co., Philadelphia 1	Encyclopedias: Bull & Berger, Boston 1	Engineering Instruments: Heiler & Brightly, Philadelphia 1 W. Kuebler, Philadelphia, Pa. 1 James Prentiss, 164 Broadway, N. Y. 1 W. J. Young & Sons, Philadelphia 1	Excavators: S. B. Alger, Long Island City, N. Y. 1 John Southern & Co., Boston 1	Files: G. & H. Barnett, Philadelphia 1	Frogs and Crossings: H. & H. Elliott, E. St. Louis, Ill. 1 Seamless Steel Ware & Frog Co., Harrisburg 1	Holding Engines: Copeland & Bacon, New York 1	Hotels: The Brunswick, Boston 1	Hydraulic Jacks: Richard Dugden, 24 Columbia st., N. Y. 1 Philip S. Justice, Philadelphia 1 McCoy & Co., 134 Duane st., N. Y. 1	Injectors: National Tube Works Co., Boston 1 Wm. Sellers & Co., Phila. & 79 Liberty st., N. Y. 1	Iron Work for Contractors: Edgemoor Iron Co., Wilm. & 79 Liberty st., N. Y. 1	Iron Buildings: Schweizer & Gruve, 71 Broadway, N. Y. 1	Journal Bearings: Geo. B. Kennedy & Co., West Troy, N. Y. 1 C. J. A. Dick, Philadelphia 1	Locomotives: Baldwin Locomotive Works, Philadelphia 1 Brooks Locomotive Works, Dunkirk, N. Y. 1 Danforth Loco. & Mach. Co., Paterson, N. J. 1 Dickson Mfg. Co., Scranton, Pa. 1	Hinkley Locomotive Works, Boston 1 Manchester Loco. Works, Manchester, N. H. 1 Mason Machine Co., Taunton, Mass. 1 National Loco. Works, Connelville, Pa. 1 Pittsburgh Loco. & Car Works, Pittsburgh 1 Porter, Bell & Co., Pittsburgh 1 Rogers Loco. & Machine Works, Paterson, N. J. 1 Schenectady Loco. Works, Schenectady, N. Y. 1 Taunton Loco. Mfg. Co., Taunton, Mass. 1	Locomotives to Lease: U. S. Rolling Stock Co., 74 Wall st., N. Y. 1	Locomotive Balances: T. S. Morton, 65 Elizabeth st., N. Y. 1	Lubricators: C. H. Marshall, Detroit 1	Machinists' Tools: W. B. Bennett & Son, Philadelphia 1 Farris & Miles, Philadelphia 1 H. Harrington & Son, Philadelphia 1 Wm. Sellers & Co., Phila. & 79 Liberty st., N. Y. 1	Mortising Machines: Lane & Bodley, Cincinnati 1	Paint: Iron-Clad Paint Co., Cleveland, O. 1 E. Maxwell & Co., St. Louis 1 Frisco's Metallic Paint Co., 225 E. 2d st., N. Y. 1 Rogers & Co., Fort Wayne 1	Quick-Stop Train Brakes: Wm. Loughridge, Baltimore 1	Rails: Albany & Renss. Iron & Steel Co., Troy, N. Y. 1 Cambria Iron Co., Johnstown, Pa. 1 Cleve. Rolling Mill Co., Cleveland, O. 1 Dana & Co., 20 Nassau st., N. Y. 1 Edgar Thomson Steel Co., Pittsburgh 1 Geo. A. Evans, 74 Wall st., N. Y. 1 North Chl. Rolling Mill Co., Chicago 1 Springfield Iron Co., Springfield, Ill. 1	Rail Fastenings: American Ry. Supply Co., Pittsburgh 1 Atwood Con. Lock Nut Mfg. Co., 40 Broadway, N. Y. 1 Fisher & Norris, Trenton, N. J. 1 Louisville Lock Washer Co., Cleveland 1	Railroads and Transportation Lines: Atlantic & Great Western 1 Baltimore & Ohio 1 Chicago & Alton 1 Chicago & Milwaukee & St. Paul 1 Chicago & North Western 1 Chicago, Rock Island & Pacific 1 Cleveland, Col. & Cin. & Indianapolis 1 Erie Railway Co. 1 Empire Transportation Co. 1 General Transatlantic Co. 1 Illinois Central 1 Michigan Central 1 New York Central & Hudson River 1 New York and New England 1 Northern Pennsylvania 1 Pennsylvania 1 Philadelphia & Reading 1 Philadelphia, Wilmington & Baltimore 1 Union Central 1 Wisconsin Central 1	Railroad Land Companies: A. N. Kellogg, Chicago 1	Railroad Manuals: H. V. & H. W. Poor, 68 Broadway, N. Y. 1	Railroad Securities: J. S. Kennedy & Co., 4 Cedar st., N. Y. 1	Railroad Car Brakes: Wm. Loughridge, Baltimore 1	Railway Signals: Saxby & Farmer, London 1	Rubber Goods: Hamilton Rubber Co., Trenton, N. J. 1 Rubber-Stop Manufacturing Co., Boston 1	Safe Deposit: Safe Deposit Co., 140 Broadway, N. Y. 1	Seal Chains: T. S. Morton, 65 Elizabeth st., N. Y. 1	Shafting: Wm. Sellers & Co., Phila. & 79 Liberty st., N. Y. 1	Signals: Hall Ry. Signal Co., West Meriden, Ct. 1	Spikes: Dilworth, Porter & Co., Pittsburgh 1 Pottsville Spike Works, Pottsville, Pa. 1 Tudor Iron Works, St. Louis & Chicago 1	Spring: Columbia Car Spring Co., 322 Seventh ave., N. Y. 1 Culmer Spring Co., Pittsburgh 1 A. French & Co., Pittsburgh 1	Steel and Steel Tires: Lease Jones & Sons, 134 Duane st., N. Y. 1 Midvale Steel Works, Nicetown, Philadelphia 1 Thomas Prosser & Son, 15 Gold st., N. Y. 1 Randall & Jones, Boston 1 Standard Steel Works, Philadelphia 1	Switches: Pennsylvania Steel Co., Harrisburg 1 Wharton R. R. Switch Co., Philadelphia 1	Taps and Dies: H. S. Manning & Co., 113 Liberty st., N. Y. 1	Track Tools: L. O. Crocker, Weymouth, Mass. 1	Turn Tables for Railways: Wm. Sellers & Co., Phila. & 79 Liberty st., N. Y. 1	Valves: Ludlow Valve Manufacturing Co., Troy, N. Y. 1 Peet Valve Co., Boston 1	Varnishes: Berry Bros., Detroit 1 Murphy, Sherwin & Co., Cleveland 1 Valentine & Co., 323 Pearl st., N. Y. 1	Watches: Giles, Bros. & Co. 1	Watchman's Time Detectors: J. E. Buerk, Boston 1	Welding Compound: Schierloh Manufacturing Co., Jersey City 1	Wire Ropes: J. A. Roschling's Sons, Trenton, N. J. 1	Wrenches: A. G. Coes & Co., Worcester, Mass. 1 L. Coes & Co., Worcester, Mass. 1	Wanted and For Sale:
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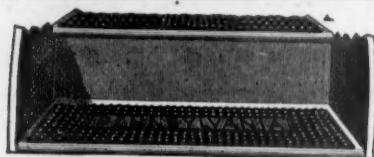


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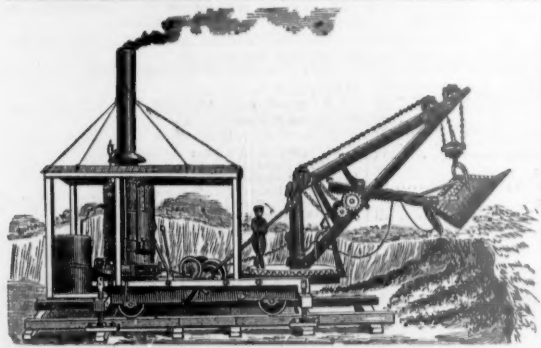


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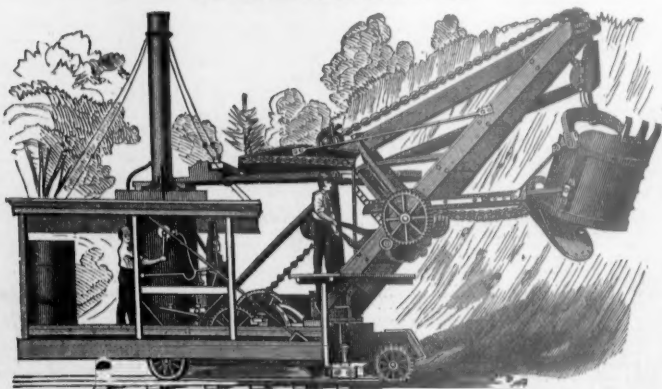
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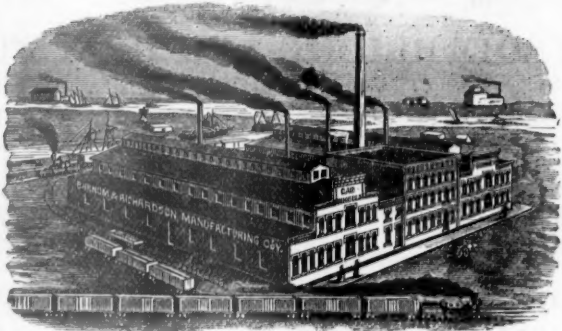
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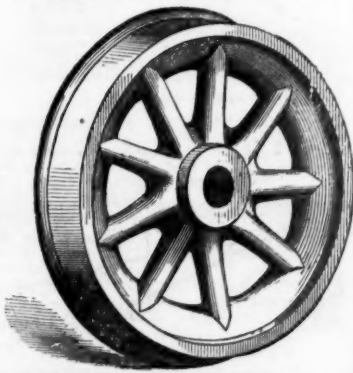
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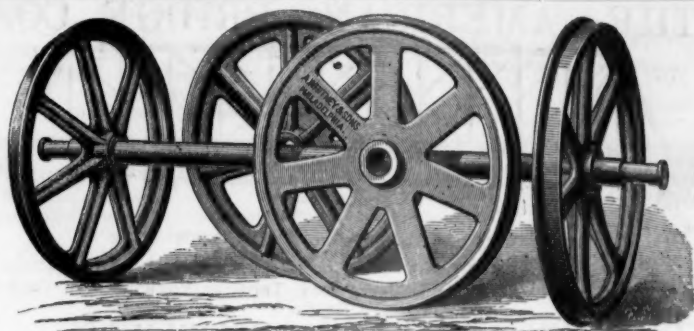
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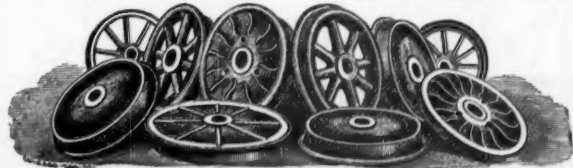
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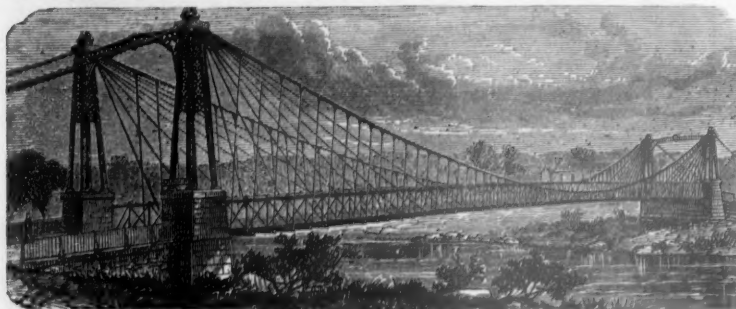
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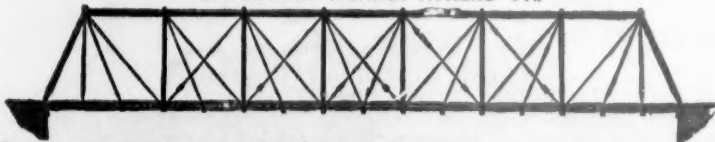
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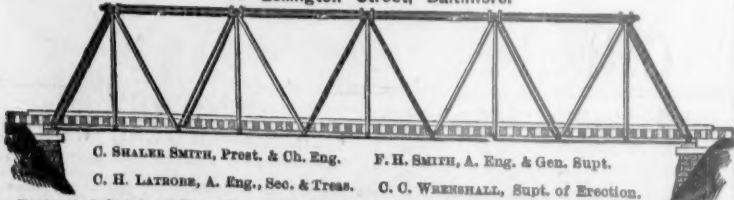
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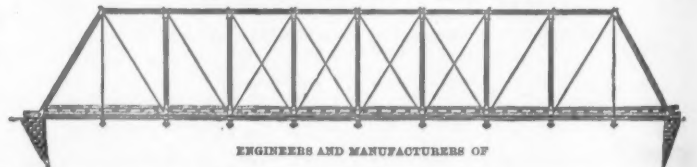
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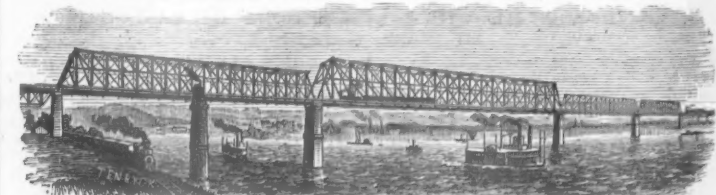
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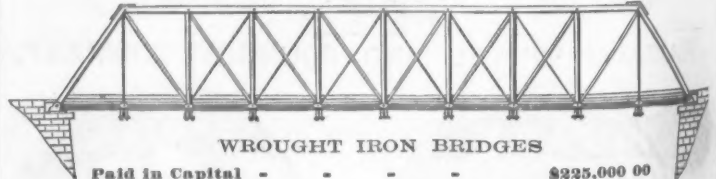
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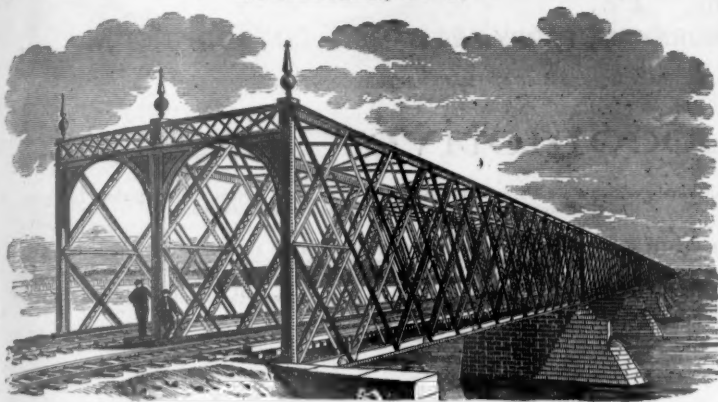
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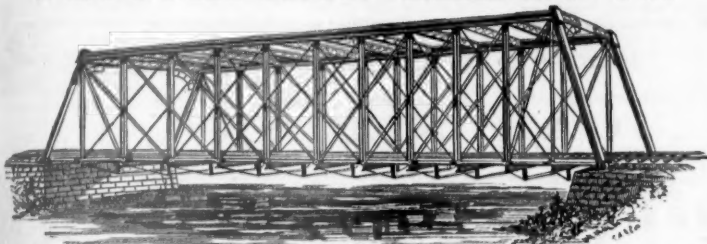
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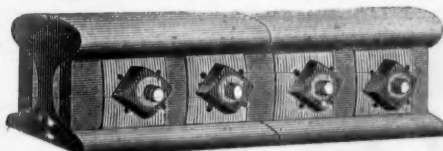
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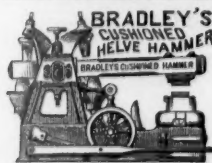
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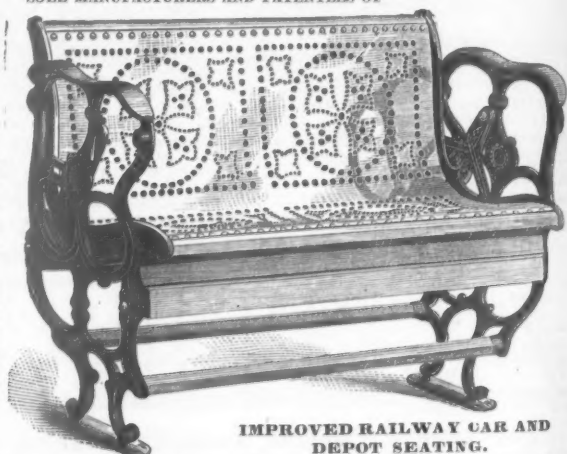
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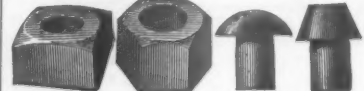
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FRIDAY, MARCH 16, 1877.

Statement and Verdict of the Coroner's Jury on the Ashtabula Disaster.

To E. W. Richards, Acting Coroner:

The Coroner's jury, which for more than two months past have under your direction been engaged in investigating the late railroad disaster, which occurred on the evening of the 29th of December, 1876, have deemed it best, under all the circumstances surrounding the case, to prepare a short prefatory statement designed to accompany their verdict, and herewith you will find both statement and verdict, duly signed by all the members of the jury:

ASHTABULA, March 8, 1877.

In entering upon the duty of ascertaining the cause and manner of death of the victims of the late railroad disaster at Ashtabula, the jury found themselves at the very outset embarrassed by the limited powers conferred on coroner's juries by the law. As the law stands, it was only made our duty to inquire into the manner and cause of death. This could at once have been decided and a verdict rendered in few words. "They came to their deaths by the falling of the bridge." Would the public mind have been satisfied with such a verdict? Would the safety and lives of passengers been any better assured by such an investigation and finding? Would the means and measures necessary to prevent future loss of life been at all furthered by an examination eliciting no evidence beyond the facts necessary to determine that the bridge fell and caused the deaths of those unfortunate? Or, should the inquest take a broader scope and inquire whether the failure of the bridge was due to any defect, either in plan, construction or care; whether any, and if any, what means and appliances were at hand and available to extinguish the flames; whether blundering stupidity or selfish carelessness had sacrificed human lives and caused human suffering which might and ought to have been prevented; and if so, to place the responsibility where it belonged. It seemed to us that the appalling nature of the disaster, the fearful cost of human life, the widespread desolation of hearts and homes, together with the earnest appeals made for the adoption of some measures to prevent the recurrence of similar accidents, demanded a thorough and exhaustive investigation, having all the scope that could be reasonably given to it, and embracing all matters touching the safety and sacredness of human life. With this end in view, we have, as far as lay within our power, endeavored to ascertain all the facts having any bearing upon these points.

Without power under the law to compel the attendance of unwilling witnesses, or authority to enforce the production of papers, it will be seen that the jury labored under serious difficulties in the prosecution of what they deemed their duty, and we desire to return our thanks to the officers of the railway company, who so cheerfully aided us in securing the attendance of witnesses, and also to those gentlemen who, as civil engineers and experts of high standing in their profession, traveled long distances and spent days and weeks in making a thorough and critical examination of the wrecked bridge, at the joint request of the jury and railway company. The written reports and testimony of these gentlemen have been of great service to us, and will well repay careful perusal, as on them is based our verdict in regard to the bridge.

Among the witnesses examined are the following:
Of railroad officials and employees, Charles Paine, General Superintendent; George M. Reid, Superintendent of Bridges; Harvey Tilden, Superintendent of Water Works; A. A. Strong, Station Agent; John Manning, J. G. Burton and C. B. Leek, telegraph operators at the railroad station; A. L. Rodgers, under whose supervision the bridge was erected; James Doran, track master; James Manning, engineer at the pump-house; Daniel McGuire, engineer on the locomotive Socrates; Mr. Bernhart Hume, conductor, and A. L. Stone, rear brakeman on the ill-fated train; N. W. Simons, night ticket agent; Henry Apthorp, Superintendent of Telegraph Repairs; Charles Philbrook, painter; George H. Carpenter, John Sohlinger, Augustus Wentworth and Albert H. Congdon.

Of members of the city Fire Department, G. A. Knapp, Chief Engineer; George Brake, foreman of Protection Company No. 1; Michael Tinley, foreman of Lake Erie Company No. 2; E. A. Hitchcock, Captain of the steamer Neptune, and Charles L. Neerline, engineer; George W. Cully, Theodore H. Sievers, D. H. DuBois, Levi A. Ensign.

Citizens, A. C. Tombes, Jas. C. Stebbins, Mrs. Lettie Bancroft, George Field, Riley W. Hillier, E. W. Lockwood, James L. Porter, H. P. Hepburn, C. E., Mayor of Ashtabula, and F. D. Case, M. D.

Of persons on the train, Capt. C. H. Tyler, of St. Louis, Mo.; Henry A. White, of Connecticut; F. E. Swift, of Massachusetts; P. Osborn, of Tecumseh, Mich.; and Edward Truworthy, and J. A. Thompson, of Oakland, Cal.

Of civil engineers and practical bridge builders, Albert H. Rowland, C. E., of Boston, Mass.; Job Abbott, C. E., and Vice-President of Canton Bridge Co., Canton, Ohio; A. Gottlieb, C. E., and Superintendent of the Western Department of the Keystone Bridge Co., headquarters Chicago; E. N. Beebout, C. E., in employ of the Canton Bridge Co., Canton, Ohio; Joseph Tomlinson, who, under the direction of Mr. Stone, drew the plans for this bridge, and who is at present in the employ of the Canadian Government as General Superintendent of Light Houses; J. D. Crohore, C. E., of Cleveland, Ohio; Budlong Morton, C. E., of New Haven, Conn.; and Chas. Hilton, C. E., in charge of terminal facilities and Sixtieth street improvements for New York Central & Hudson River and Harlem Railroads, New York City.

There was, as might have been expected, some minor differences of opinion among these professional engineers, but they substantially agree in a disapproval of the Howe truss plan for wrought-iron bridges for long spans, and of the manner in which this bridge was constructed as being defective in section in the top chords and main braces, especially in the end panels; and also as to the inadequate provision made to secure unity of action among their different members. They also agree in a disapproval of the system of lateral bracing as being of little value, and especially the vertical away bracing as being defective in the manner of fastening to the angle blocks and deficient in number to secure the bridge against construction from the severe lateral strains to which it was liable from oscillations of trains and the force of strong winds. Mr. A. L. Rodgers, Mr. Albert Congdon and Mr. George H. Carpenter, all testify that the bridge, as first erected in accordance with the original drawings, was a failure, and after two trials, in which the bridge failed to bear its own weight, modifications were introduced which were wise and judicious, as far as they went; but introducing these changes, especially the chipping away of the lug cast on the angle-blocks to hold the head and foot of the braces in position, thus depending wholly upon friction between two plane surfaces to keep these important compression members in proper position. And further, it was found necessary, in order to accommodate the vertical truss-rod where they passed through the angle blocks, to chip away portions of the flanges of the Phoenix beams, and in

some cases a part of the web also, thus reducing their section and lessening their bearing surface.

It is from a careful consideration of the evidence elicited from these professionals and experts that our verdict is made up in the matter of the bridge, and should it seem severe upon the railway company, or upon any of its past or present officials, it is because the truth, as shown by the evidence, demands it at our hands. We cannot do less and feel that we have discharged our duty.

Mr. Amasa Stone, President of the company at the time of the erection of this structure, had been for years a prominent and successful railroad contractor and builder of wooden Howe truss bridges. With the undoubted intention of building a strong, safe and durable wrought-iron bridge upon the Howe truss plan, he designed this structure, dictated the drawing of the plans and the erection of the bridge, without the approval of any competent engineer and against the protest of the man who made the drawings under Mr. Stone's direction, assuming the sole and entire responsibility himself. Iron bridges were then in their infancy, and this one was an experiment which ought never to have been tried or trusted to span so broad and deep a chasm. This experiment has been at a fearful cost of human life and human suffering. Unquestionably Mr. Stone had great confidence in his own abilities and believed he could build and had built a structure which would prove the crowning glory of an active life and an enduring monument to his name. The testimony of competent and skillful engineers is that subjecting an iron bridge to a severe strain, as a test, before using it in carrying on the traffic of the railroad, is of no value as showing its ability to bear repeated strains. It only shows that it bore the test that time, and it may have permanently crippled it, so that its final failure was only a question of time. The sure rule is to leave a large margin of safety, as shown by a careful computation and distribution of the strains. That the officials of the railroad regarded the bridge as safe we have no doubt, as two of them were on the train that went down, and all were more or less frequently passing over it.

In pursuing our investigation we have labored in the hope that the facts elicited and the faults and failures brought to light might, in a measure, be instrumental in securing such legislation by the proper authorities, and such care and precaution on the part of railroad companies, as should insure passengers upon our great thoroughfares a greater immunity from such terrible disasters as the one which so lately happened in our midst.

THE VERDICT.

We the undersigned jurors * * * do find as follows:
First: That on the evening of Friday, Dec. 29, the iron bridge on the railroad of the Lake Shore & Michigan Southern Railroad Company spanning Ashtabula Creek, near Ashtabula Station, did give way under two locomotives and an express car, forming the forward portion of a west-bound passenger train on said railroad, and fell, as the leading locomotive passed on the west abutment, leaving a chasm of about 60 feet in depth between the abutments of said bridge, into which the passenger and baggage cars in said train following said express car were precipitated.

Second: That in their fall the cars were partially destroyed by crushing, and their destruction was completed by a conflagration immediately following, kindled by fire from their stoves.

Third: That the fall of the bridge was the result of defects and errors made in designing, constructing and erecting it; that a great defect, and one which appears in many parts of the structure, was the dependence of every member for its efficient action on the probability that all or nearly all the others would retain their position designed, and do duty for which they were designed, instead of giving to each member a positive connection with the rest which nothing but a direct rupture could sever. The members of each truss were, instead of being fastened together, raised one upon the other, as illustrated by the following particulars: The deficient cross section of portions of chords and some of the main braces, and the insufficient strength and bad arrangement of both the horizontal and vertical transverse bracing; in the construction of the angle blocks as finally modified, without sufficient lugs or flanges to keep the ends of the main and counter braces from slipping out of place; in the construction of the packing and yokes used in binding together the main and counter braces at the points where they crossed each other; in the shimming of the top chords to compensate the deficient length of some of their members; in the placing during the process of erection of thick beams where the plan required thin ones, and thin ones where it required thick ones.

Fourth: That the railroad company used and continued to use this bridge for about eleven years, during all of which time a careful inspection by a competent engineer could not have failed to discover these defects. For the neglect of such careful inspection the railroad company alone is responsible.

Fifth: The responsibility of this fearful disaster and its consequent loss of life rests upon the railroad company, which by its chief executive officer planned and erected this bridge.

Sixth: That the cars in which said deceased passengers were carried into said chasm were not heated by heating apparatus so constructed that the fire in it would be immediately extinguished whenever the cars are thrown from the track and overturned; that the failure to comply with that plain provision of the law places the responsibility of the origin of the fire upon the railroad company. (See Act of May 4, 1869.)

Seventh: That the responsibility for not putting out the fire at the time it first made its appearance in the wreck rests upon those who were first to arrive at the scene of the disaster, and who seem to have been so overwhelmed by the fearful calamity that they lost all presence of mind, and failed to use the means at hand, consisting of a steam pump in the pumping house and the fire engine Lake Erie and its hose, which might have been attached to the steam pump in time to save life; the steamer belonging to the Fire Department and also Protection fire engine were hauled more than a mile through a blinding snow-storm and over roads rendered almost impassable by drifts of snow, and arrived on the ground too late to save human life. Nothing should have prevented the chief engineer from making all possible efforts to extinguish what fire there remained. For his failure to do this he is responsible.

Eighth: That those persons deceased before mentioned, whose bodies are identified, and those whose bodies and parts of bodies were unidentified, came to their deaths by the precipitation aforesaid of the cars, in which they were riding, into the chasm in the valley of Ashtabula Creek, left by the falling of the bridge as aforesaid, the crushing and burning of said cars aforesaid, for all of which the railroad company is responsible.

Given under our hands at the time and place of said inquiry above mentioned.

H. L. MORRISON, HENRY H. PERRY,
T. D. FAULKNER, GEORGE W. DICKINSON,
F. A. PETTIBONE, EDWARD G. PIERCE, JURORS.
EDWARD W. RICHARDS, Acting Coroner.

Contributions.

Government Inspection and Interference in Railroad Matters.

TO THE EDITOR OF THE RAILROAD GAZETTE:

The railroad system of the country has grown to its present importance in about forty years, and will be no doubt doubled

before 1900. Wise general laws may do much to perfect the system, and past experience points to the need of more stringent measures. We have laws intended to insure the public safety while in transit by water. The captain of a steamship is absolute ruler over both crew and passengers; the engineers must pass examination and obtain certificates; the hull and boilers must be inspected by persons appointed for the purpose; and as all this is considered essential to secure the safety of the public, both owners and employees submit.

There seems to be as much need for Government supervision of bridges as of steamboats and boilers. Railroad superintendents and engineers are not all experts in regard to steam engines and bridges any more than sea captains are respecting the property under their charge.

Train-wreckers are sometimes severely punished if caught, penalties are provided for obstructing the mails, and many laws are framed to protect the public, such as regulating speed of trains in cities, signals at highway crossings, stops at railroad crossings and draw-bridges, and various other safeguards, are interposed by law. We now come to strikes of employees, but I only wish to notice particularly those like the Grand Trunk and Boston & Maine of the locomotive runners.

They say: "The superintendent has a right to discharge us when he pleases without notice, and the same right to quit should belong to us."

The locomotive runner should be as much bound to complete his run and deliver his engine at the home station as the marine engineer is to work his steamer into port. The public has nothing to do with the quarrels between the officers of the road and the men: either or both may be wrong, as they generally are, or at least unreasonable. The greatest intelligence and coolness should be expected on the side of the officers, but even moderation fails when the demands of their servants are too unreasonable, or when the means employed to gain their end are low, rowdyish and perhaps criminal.

When the company undertakes to control the conduct of their employees off duty, or in their political action, they are going outside of their proper sphere.

Strikes on account of delayed salaries I do not wish to include, as the men must have their money to live on, and any company fit to exist and worthy of public confidence can and will generally provide against such a contingency; but the stoppage of trains on the main line at a certain fixed hour, regardless of their location, and to the inconvenience, discomfort, loss of time and money of the public, should not be upheld in any State; violence, either threatened or used, should be punished, and such laws as may tend to prevent such strikes should be enacted. Locomotive runners have a hard, hazardous life, constantly exposed to danger, but they have chosen it themselves, and if their rules and regulations as a Brotherhood sustain them in their interference with the public welfare, I am sorry, for I hoped the Order had higher motives.

There are two sides to all these questions. The men will rarely strike on any road where they are fairly treated and promptly paid; but while conceding all reasonable rights and protection to them, there should be some consideration of the rights of the public, and some legal support given to railroad Superintendents.

Feb. 28, 1877.

Supt.

Popular Mistakes Concerning Freight Bolster Springs.

[SECOND PAPER.]

TO THE EDITOR OF THE RAILROAD GAZETTE:

Since the publication of the spring article in your issue of the 26th ult., I have been asked for information as to what form of steel spring would be most economical for a railroad company to use in freight service, and to give some "statistics" corroborative of my views.

The circumstances attending the use of springs of this sort are so varied that it is practically impossible to gather accurate "statistics" as to their general use, as yet. We may do this when our railroad companies become more matured and adopt a common system of reports that will show complete records of the service of the various kinds of equipment, and when their regulations will insure their rolling stock against the abuses that it is now (in many cases) subjected to.

However, I can give some points corroborated by practical reasons, that may strike a thoughtful railroad man favorably.

I believe that the qualifications of the "coming" freight bolster spring should be:

1. Elasticity, under the extremes of light and heavy loads.
2. Slow vibration.
3. Durability.
4. Simplicity of construction.
5. Absence of inactive material, such as iron castings, iron bands, bolts, etc.—all of which form no part of the spring, but merely serve to hold it together.
6. Proportionate distribution of metal throughout its parts.
7. Sufficient range of motion.
8. Cheapness.

The first qualification above noted is, in my opinion, the most important, being the vital element that a spring should possess in every stage of service.

Still, very few of the popular patterns of "springs" of the day possess it.

The elastic resisting force of all springs, of whatever form, is adjusted by the distortion of the fibres of steel of which it is composed.

In the elliptic, increase of deflection or "set" will give increased resisting force from the same amount of material.

In the spiral, decrease of diameter and increase of pitch show the same result.

The popular mistake in the abuse of this principle has been that railroad men, in pursuit of the *ignis-fatuus* of "saving," have bridged the gap of immediate expenditure, only to run into the marsh of enormous "current repairs," by reducing the

amount of material in their springs to such an extent as to destroy their effectiveness as springs.

The error of equipping freight cars with "springs" which are not springs—any more than a mollusk is a mammal—is wide-spread, and is to-day the active cause of continued and erroneous expenditures on the part of railroad companies, in the way of car repairs and keeping up the road-bed.

It may be that railroad officials are not usually aware of the amount of expense created through this cause, because "statistics," connecting the effect with the cause, and showing the accurate relation of one to the other, cannot be compiled.

"Current repairs" is an elastic term, and may denote expenditure under reckless or careful management, and it is seldom that the scrutiny of true economy is applied to this item, with a view to its curtailment.

It is regarded by those in authority pretty much as a man of family considers the expenses of housekeeping, as a matter of course; but he never knows what becomes of his money.

The damage caused by rigid springs is general and gradual. The car is racked to pieces from track to sill and from sill to roof, and after being tightened up and repaired a few times is considered "worn out," when the fact is, it was *jolted out*.

Perhaps you cannot tell how many jolts were required to do it, but it is so, nevertheless.

It is like the damage to a man's health caused by whisky. He cannot point to a particular drink or number of drinks that destroyed his health and wrecked his character, yet the destruction was just as rapid and effectual as if he could give you statistics. The cause of this evil is "short-sighted" economy.

It is the effort to effect an *immediate* saving, to make a "good showing" in this year's report, which saving is more than counterbalanced by excessive expenditures for repairs in next year's report.

It is saving at the spigot, but losing at the bung-hole.

The correction of this extravagance depends upon one condition that is imperative, viz.:

A more liberal use of steel.

Stiff springs are rigid when lightly loaded.

Weak springs are rigid (or solid) when overloaded, so that their entire range of motion is absorbed.

Both of these conditions are usually caused by the want of sufficient material.

THE REMEDY

that we want is one that will save the car-body from the "racking" of rigid springs, of sharp, sudden vibration, and the car and road-bed from the *solid pounding* of overloaded weak springs.

Both ends can be accomplished by the use of **PLENTY** of material (steel), intelligently applied.

If a set of spiral freight springs, designed to carry a ten-ton load without closing, are rigid under a light load, we can only make them sensitive under a light load by increasing the diameter and reducing the pitch (*i. e.*, lessening the distortion of the fibres of the steel).

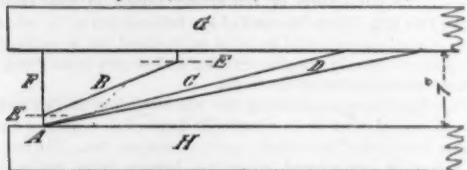
This would have the effect of robbing them of their capacity to carry heavy loads unless more material were used. We then increase the amount of material in the spiral and thereby accomplish four things:

1. We get elasticity under light pressure.
2. We get strength to withstand heavy pressure.
3. We get increased durability.
4. We get a *quality* of elasticity that serves as an *absorbent*.

For illustration, we will take two sets of spiral springs of kinds now used.

One set of 28 spirals, 98 lbs. steel.

One set of 24 spirals (2 in a nest) 210 lbs. steel.



A represents the vibrating point at which the shocks of service are communicated to the vibrating media B, C and D, and transmitted through them to the bolster G.

B, C and D represent the bars of the spirals of the different springs straightened out so as to show the relative lengths of the bars.

B represents the length of each of the 28 spirals in the 98 lb. set. These are grouped in castings which fill space to lines E and F, between bolster and sand board, consequently the vibration of B is confined between these two lines.

C and D represent the comparative lengths of two spirals nested one within the other (C within D), the ends of which rest right on the wood, thus filling the entire space (7 in.) between G and H with elastic media.

F represents an upright column or the shortest medium that can be applied to fill the space between G and H.

A shock communicated at A would have to traverse but half the distance, if transmitted through B, that it would if transmitted from the same point through D, before its effect would be felt at the bolster G.

Instead of being transformed into a *slow* and elastic vibration, it would simply be divided into a series of *sudden* and violent little shocks.

Through F it would be transmitted to the bolster G with almost the same violence as communicated at the point A.

Thus, we see that in proportion as we depart from D in the direction of F in form, we approximate the effect that would be the result of using solid columns instead of springs.

We get increased *strength* from less material, but we also get *solid pounding* instead of *elastic vibration*.

The effect of this difference on road-bed and rolling stock is obvious.

I think that some of the popular "springs" of to-day suggest

the idea that we are (to use a geological comparison) just emerging from the age of mollusks with respect to springs, and they embody just enough animation to distinguish them from entirely inanimate material; and following the Darwinian idea, let us hope that in the course of evolution, a more perfect and useful spring may be developed, which in its symmetry and effectiveness will be suggestive of the intelligence of MAN, rather than that of the oyster.

CINCINNATI, Feb. 24, 1877.

GEO. KINSEY,
of Columbia Car Spring Co.

Train Orders.

TO THE EDITOR OF THE RAILROAD GAZETTE:

Mr. Joseph Taylor, in his book, "A Fast Life," asserts that train dispatchers have to "occasionally supply intelligence as well as running orders to train men." Though humorously intended, the assertion is practically true. "E. C. Centric" evidently concurs in this opinion, and regards the mishap by which "C. B. & Q. 101," and the wild-cat came to grief as the result of a failure to supply as aforesaid.

There is no doubt whatever that the order as given in this instance was technically correct. The question is simply where moral responsibility came into play.

The position of a dispatcher is a very thankless one.

He is expected to be perfect, whatever any one else may be.

He is to sit in his chair "like patience on a monument," knowing that the responsibility of the successful workings of the road rests upon him, and yet bear without grumbling the curses of every one, from water boy on the gravel train to the passenger in the palace car, for delays which are in no wise his fault—or for a delay of minutes at one point to avoid a delay of hours by a blockade at another.

But that is what he is paid for, and if he accepts the position he must take these things with it as inevitable.

He is not to act like an automaton and say that it is no part of his business to "go behind" the circumstances in each case in which he gives an order.

He cannot assume that all whom his orders affect are on a par as regards intelligence, ability or experience.

He takes into consideration a score of times a day, before deciding on an order, whether it is "Bill" (who will "whoop 'em up a little") who is on the engine, or "Joe," who believes in keeping to regulation time. And if on a stormy night he has a train on the "long switch" half a mile from an office, he thinks whether the operator has a cork leg or not, and the length of time he will probably consume in getting to "em" before he sends the order.

So, too, it is manifestly his duty to take every precaution for safety and to supplement the deficiencies and inexperience of men, when known to him, by suggestions and cautions.

He must not expect any credit for this, however, and will doubtless be called an old maid for his pains.

Had the references to "C. B. & Q. 101" been inserted in the order, as "E. C. Centric" seems to think so desirable to have been done, the accident would not have happened. But I presume the order would have been exhibited at the round-house "caucus" as evidence that the dispatcher "thought the men didn't know their business" and was on the point of going crazy, sure pop. It would be greatly to the benefit of the service if there could be a better understanding between dispatchers and trainmen, the former standing less on their dignity on fine points, and the latter exercising less talent for mulishness.

COW CATCHER.

Good Locomotive Service.

CLEVELAND, Ohio, March 7, 1877.

TO THE EDITOR OF THE RAILROAD GAZETTE:

As accurate railroad statistics are of interest to the multitudes engaged in that business, I venture to send you the following, hoping you may find room for it in your columns.

In September, 1876, engine No. 84, built by N. E. Chapman, Master Mechanic of the Cleveland & Pittsburgh Railroad and run upon that road, came into the shops for general repairs for the first time after having run 102,717 miles without having had her tires turned, or even having been raised off from her drivers. It is pretty good evidence that she was not completely run down after this feat, since she took the premium for cheap running only two or three months previous to coming into shop. Engineer Henry Shannon ran the engine during all this time. She is a standard freight engine, weight 32½ tons, 16x24 cylinders, 5 ft. drivers, and has been in that service continually. Her record has been so remarkable that a few averages may not be amiss:

Average cost per mile—	
Of stores.....	0.77 cts.
Of repairs.....	1.05 "
Of fuel.....	4.53 "
Of wages, engineers, firemen and cleaners.....	7.07 "

Total.....13.42 cts.
and an average of 50 miles per ton of coal.

Can some one of your numerous readers excel this record?

F. I. GURBS.

The Location of the Cincinnati Southern Railway.

TO THE EDITOR OF THE RAILROAD GAZETTE:

Since leaving the Cincinnati Southern my attention has been called to an answer (?) to my letter of the 9th February, which in justice to myself, simply, I shall stop to consider.

To abuse the plaintiff's attorney simply for the sake of abusing him never has been my custom, and the only reason why said attorney should feel so profoundly aggrieved is, I fancy, that the funeral of the Cincinnati Southern did not occur according to said attorney's programme.

There is no hope of convincing the writer "On the Justifiable Expenditure for Improvement in the Alignment of Railways" of the truth of my statements in regard to the cost of construction of Division H, nor of what was said concerning his proposed Sequatchie valley line. He deems himself impregnable in his position, and therefore, fortified with the "Preliminary Report on Surveys," and the "official" estimate of the Tennessee

valley line, shuts himself up in his conceit, and hurls on the defendants the ebullition of his virtuous indignation.

I shall make but two statements in regard to what was contained in my letter in your issue of the 9th February, and having made them shall rest the case, being convinced that those who have been curious enough to read the articles on the "Location of the Cincinnati Southern Railway" will judge fairly whether I am "ignorant" as regard to facts, whether I am "guilty of intentional misrepresentation," or whether the plaintiff's attorney has not been guilty of very ungentlemanly and indecent assertion.

When it was said that the cost of constructing Division H would average \$14,000 per mile, I had before me, what would be near enough for the purpose, the *final estimate* of ten miles of that Division. I know those estimate notes will not be materially changed when the contractors are finally paid. Those ten miles were used as a basis of comparison to estimate the cost of Division H.

The estimated cost of the ten miles under consideration was \$141,000, not including 390 feet of wooden truss bridging, at say \$23 per foot, 90 feet pile bridging, and the timber work on several small open drains, several road crossings not estimated, two side tracks one-fourth mile long each, engineering expenses, expense for right of way, borrow pits, spoil banks, and the proportional expense of the division and the general offices.

This residency was somewhat heavier than two others on the division, whilst the fourth was very nearly the same.

It is but just to all concerned to say that the chief difference between the approximate and the final estimate is made by the increase in the area of waterways which was found necessary, and in the length of haul which it was impossible to avoid in securing suitable rock for the more important masonry, the haul allowed in many cases being six miles.

This Mr. Wellington has utterly lost sight of in amplifying my figures.

Second, in regard to the Sequatchie valley line, the engineer in charge of the surveys for the Cincinnati Southern Railway, and he who made the "Preliminary Report on Surveys," so much and oft quoted by Mr. Wellington but a few days since, assured me that what he said about the Sequatchie valley was merely *relative*, only *comparative*; that it had significance only when taken in connection with the balance of the line, such, for instance, as the work through Southern Kentucky, or that portion from Pikeville to the plateau of the mountains.

Furthermore, he said that the cost of building in the Sequatchie valley would be altogether the same as that in the Tennessee valley; that there would be no material difference in the cost of building the average mile on the two lines.

This is what everybody says with whom I have conversed who is able to render an *intelligent* opinion, except he of "Justifiable Expenditure," who, I venture to say, has never been within three hundred miles of the Sequatchie valley.

In this connection it should be noted, that 15 cents per cubic yard for general gradation is not the "average ruling price" on the Cincinnati Southern Railway.

In Sequatchie valley, as in the Tennessee valley, we have the following classified materials: *earth, hard pan, loose rock, solid rock, excavation in water, extra haul and embankment*. The millennium for cheap railroad building, and for *intimidated and book engineers*, will have come when the cry of *classification* shall no longer be heard in the land, when writers on "Expenditures for improvement of railways" can find contractors who are generous enough to *contribute* to railroad corporations by doing their work at Mr. Wellington's "average ruling prices" when suitable quarries for masonry will be obliging enough to squat within a mile of any necessary structure, and when engineers are found who would be able and willing to make good the amount of their under-estimates.

It was our intention to criticize the article on the "Location of the Cincinnati Southern Railway" only in so far as it related to following down the South Fork of the Cumberland, and the proposed Sequatchie valley line. In these two conspicuous instances, I think it has been clearly shown that the learned writer "On the Justifiable Expenditures for Improvement in Alignment of Railways" has not only betrayed a want of courtesy, but also a lack of sufficient knowledge about which he is writing.

JAMES D. BURE.

ATCHISON, TOPEKA & SANTA FE RAILROAD,
March 5, 1877.

Train Orders.

TO THE EDITOR OF THE RAILROAD GAZETTE:

In reply to "Age," in the *Gazette* of Feb. 16, I will say that there are two extremes in the method of handling trains. The first is the old style, where the conductor depends entirely upon himself and his time card to get his train over the road. This method was in force for many years and upon many roads, and train-men used to this custom were always on the alert, and worked safely their trains, where men not trained as they were would fear to move. They knew the rules by heart, the times of trains, and the ideas and habits of their fellow-employees. When late, and working against another train, they would run for the centre as readily as men of these days run for a meeting point, and the one not reaching it first would back out, letting the more fortunate one have the road.

In the course of time, rules of various kinds were added to cover the wants of increasing business, till our modern time cards seem to provide for almost any emergency.

The other extreme is where the movement of the trains is taken entirely from the conductor and controlled by the station-man—he only knowing anything as to where other trains are. This, termed a block system, is in use to a greater or less extent. The conductor might as well be in the next county for all he knows of the rights of his own or other trains.

The one system develops our conductors into careful, thinking men who are self-reliant; the other takes away all cause or opportunity for thought or care. The one puts the power and

knowledge into the hands of the man who is most interested in the success of the movement, as his life is at stake; while the other takes all power away from him, while it redeems none of the risks.

The last system has not gained a foot-hold to any extent upon our American roads, and has shown its weak points elsewhere. The first, on our larger roads, has been found unequal to the increasing wants, and either a double track must be had or some other mode of doing the work found.

The good of each system has been selected, and much discarded, till we have our present American system of train dispatching—a mean between the two extremes.

You retain the thought and study required in the first, and secure all the additional points of the second and much more.

You give your conductor the right to run as a wild train, if you please, over a line. He knows that there is no wild train running against him, and he has only the regulars to look out for. If there be ten regulars on the card, and one is abandoned, he is told of that, and he works against the other nine, expecting them on card time. We can fix the meeting point of the first one, as "Age" thinks should have been done in the case at Quincy; but how about the second, third, fourth, and so on up to the tenth? Shall we fix them all? If so we take all incentive to mind action on the part of the conductors away, as surely as on the second system mentioned, and worse; for we in that case simply say to him, "you can run to next station" and at that one "you can go to the next," and so on to the end, but in this case we say, "meet C. B. & Q. 101 at Quincy; meet C. B. & Q. 103 at such a place, 105 at such, and so on up to 119 at some other point. Is there not much more chance for the conductor to forget where and when he is to meet 119 a few hours hence, than that he will forget all about 101 within five minutes?

Would not the man who could not remember about 101 be an unsafe man for 119 if the meeting point was fixed an hour or two later?

Or the train could be run from station to station by the dispatcher giving a fresh order each time; but here again we not only take up the time, but transpose our conductor into an automaton. Our dispatcher, who has the whole ten trains to look after, and perhaps ten others at another point, may possibly forget that a train will reach a point in five or ten minutes, and then we have trouble.

This is no fancy picture, and many dispatchers will realize the force of the argument.

Should we not take a course that will answer the best for the greatest number of cases? I most certainly say yes, and the safest course seems to be the one pointed out. As long as the human race run railroads, there will be seeking after perfection; but I, for one, do not expect to see it reached. One must, in stopping one leak, be sure that he don't start two others; and, in seeking to make train dispatching safe, he must be pretty sure that he does not aid one item at the expense of two or three in other points.

As "Age" says, a train dispatcher can not be an inferior man; but no matter how nearly perfect he be, he can not provide against stupidity on the part of others.

There is "special danger" in all meetings of trains, as well as the one mentioned; and if engineers and conductors check each other, as is usual, they seem less liable to forget than would any one man entrusted with the movement. There is one more "factor of safety."

The majority of cases must be provided for, and it seems evident that the majority were so provided for in the one in question. It was not calculated, nor can it be, in train dispatching, that at any particular time any particular man will forget any particular rule or fact. If this were always known, how easy it would be to provide against accidents! H. C.

"Surveys First and Estimates Afterwards."

TO THE EDITOR OF THE RAILROAD GAZETTE:

Either the present writer is slow of apprehension or else Mr. Wellington fails of his usual clearness in statement at that part of the last paper on location where he speaks of "the vicious but not uncommon practice of making surveys first and estimates afterwards," which practice, he adds, "is everywhere and always wholly unjustifiable, and any one who ever has done it or ever would do it may rest assured that his alignment will not stand the slightest economical analysis." If the plain sense of this language be taken and the proposition embodied in it be true, then are we all concluded under sin, for the method condemned is that which has heretofore been generally followed by field engineers. Nor does it appear satisfactorily either how a reliable estimate can precede the survey, or wherein the value lies of an estimate contemporaneous with the survey, excepting by way of a trifle of time saving, on easy ground. In hilly regions the preliminary survey would seem to be essential to an intelligent estimate and to precede it necessarily. It is hoped, therefore, that Mr. Wellington will further elaborate this matter in making up his papers for publication in book-form. WM. F. SHUNK

Cheap Wheels and Good Wheels.

DETROIT, Mich., Feb. 20, 1877.

TO THE EDITOR OF THE RAILROAD GAZETTE:

The comparative merit of chilled and steel car wheels seems to be occupying the attention of railway managers, and in your issue of Feb. 16 appears an article by Mr. Wm. S. G. Baker which would show largely in favor of chilled wheels. Having had some experience in the manufacture of wheels, and also in their use, it seems to me that one element in the question has not been taken into consideration—that is, the desire of railway managers to cut down expenses, leading them to demand low prices from the manufacturer at the expense of the quality of material used. It is simply absurd to expect a first-class article without paying a fair price for it, and to-day chilled wheels can be bought much below the price given in the article referred to, and for less than the cost to manufacture a first-

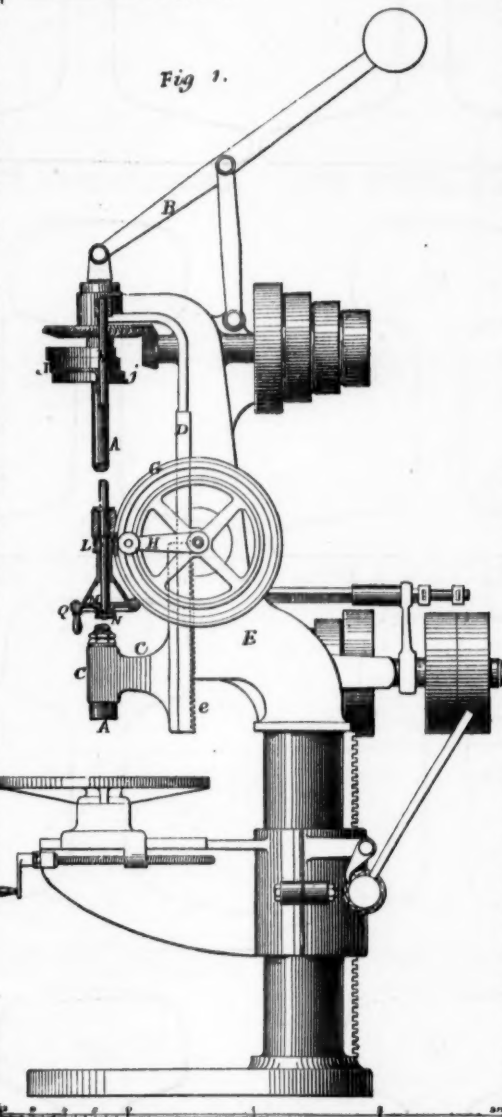
class wheel. It seems to me the true economy for railway companies is not to see how cheap they can buy a chilled wheel, but rather how perfect a wheel can be had; and then taking first cost, interest, renewals, etc., into consideration, chilled wheels will make a showing that cannot be reached by steel as now made. GEO. E. KING.

Riveted Bridges in America.

TO THE EDITOR OF THE RAILROAD GAZETTE:

I observe in Mr. Fred H. Smith's article, "Bridges and Complications," published in the *Gazette* of the 9th inst., that he estimates the aggregate amount of all the open web riveted bridges in the country at less than one-third of 22 miles. There now lies before me a tabulated statement of the number and lengths of bridges of the kind named above that have been built by one builder during the last seven years, which foots up over 8 miles, distributed over 21 different railroads and including some highway bridges; and I have sufficient data to convince me that the above-mentioned statement does not include one-half the open web riveted bridges now in use in this country. CHAS. HILTON.

NEW YORK, March 13, 1877.

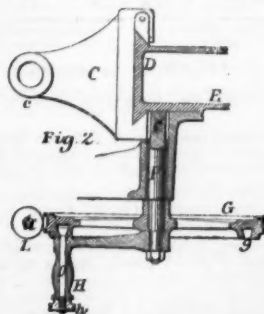


Ferris & Miles' Drill Press.

The accompanying engravings and the following description are from *Engineering*:

The illustrations are of an upright drilling machine by Messrs. Ferris & Miles, of Philadelphia, U. S. A., and shown by them at the Centennial Exhibition. In its construction there are some improvements worthy of notice which have been patented by the makers.

As will be seen by the engravings, the drill spindle A is counterbalanced by a weighted lever, B, attached directly to



its upper extremity, this lever holding it up securely against a fast collar on its lower end, and thus preventing the breakage of drills by any lost motion. The spindle A receives its rotary motion by bevel gear, having the ratio of 3 to 1, placed near the top of the machine, the spur having its face downwards to avoid dust and dirt lodging in the teeth. The lower end of the spindle A is firmly supported in a bearing C of a long carriage or saddle G, which is gibbed to the guides D of

the frame E and traverses thereon a distance of 17 in. exactly in the manner of a lathe carriage upon its bed.

The carriage C has a rack, e, cut upon it, into which gears the pinion f, whose shaft F, has a crank handle, H, fastened to it and a worm wheel G loose upon it, except when clamped by the pinch bolt o through the handle H. This pinch bolt has a wedge-shaped head which plays in the annular slot g of the worm wheel G and a pinch nut h outside of the handle H. By tightening this pinch nut the wedge-shaped head of the bolt o is jammed in the annular slot g, and the handle H is clamped firmly to the worm wheel G.

The automatic feed motion is taken off the spindle A by a belt or strap working upon the cones j and J, the larger of which, J, is fast upon the rod K and, by revolving it, serves to drive the worm screw L when clamped thereto by the friction disc m and pinch nut h in the conical hand wheel Q. When thus clamped the screw L causes the worm wheel G to revolve. It is therefore evident that when the pinch nut h is slack the carriage C, and with it the drill, may be thrown upward and downward rapidly or slowly at will by means of handle H, pinion E and rack c. When the pinch nut h is tightened, the carriage may be traversed slowly, either by hand, by means of the conical hand wheel Q, or automatically by tightening the pinch nut N.

It is to be observed that in releasing the feed motion to run the drill up, the operator's hand, after releasing the pinch nut h, is in exactly the right place at handle H. Also, in bringing down the drill to the point at which it is to have the feed put on, he has no additional movement or thought to make. It will also be noticed that the handle H, by its pinion, f, takes hold directly of the carriage with no idler gears to be driven, as in the usual "quick returns" of former machines, and that the extremity of the spindle A, guided by a traversing carriage C with long bearings, never protrudes from its bearings as in the old style machines. The drill is always equally distant from its support, and must therefore drill a true hole.

The machine is provided with a table swinging upon its column in the usual manner, but also traversing upon its bracket by a screw. The slide is arranged with a socket in such a manner that the table can be removed and a convenient clamping vice secured in its place, also a pair of centres or an angle plate as may be required for various work. The machine illustrated is capable of drilling a 1 1/4 in. hole out of solid at 15 in. distance from front of column.

The following is the report of the Centennial Judges on these machines:

"Shaping, Drilling and Planing Machines, commended for general excellence and originality in design and construction, and for accuracy."

General Railroad News.

ELECTIONS AND APPOINTMENTS.

St. Louis & San Francisco.—At the annual meeting in St. Louis, March 6, the following directors were chosen: C. E. Harwood, Springfield, Mo.; Andrew Peirce, Jos. Seligman, T. T. Buckley, W. F. Buckley, Wm. H. Coffin, T. W. Peirce, J. P. Robinson, C. J. Bergin, James Baker, Jesse Seligman, W. S. Nichols, Calvin Littlefield, New York.

Beaver Branch.—At the annual meeting in St. Louis, March 6, the following directors were chosen: Andrew Peirce, C. B. Fisk, Matthew Bird, T. B. Edgar, Jos. S. Stont, Sutherland M. Seeley, Abraham B. Baylis, Geo. M. Pullman, Charles E. Harwood. The road is leased to the St. Louis & San Francisco Company.

Cooperstown & Susquehanna Valley.—At the annual meeting lately the following officers were chosen: Andrew Shaw, President; Wm. E. Cory, Vice-President; B. M. Cady, Secretary and Treasurer.

Union Pacific.—At the annual meeting in Boston, March 7, the following directors were chosen: Elisha Atkins, F. Gordon Dexter, Benjamin E. Bates, E. H. Baker, Boston; Oliver Ames, Easton, Mass.; Sidney Dillon, David Dow, C. K. Garrison, Jay Gould, James Richardson, New York; Wm. L. Scott, Erie, Pa.; H. H. Porter, Chicago; G. M. Dodge, Council Bluffs, Ia.; S. H. Clark, Omaha, Neb.; John Sharp, Salt Lake, Utah. The new directors are Messrs. Garrison, Dows, Scott and Porter, who replace J. D. Smith, S. M. Mills, C. J. Osborne and Oliver Ames, 2d. Mr. Garrison is President of the Missouri Pacific and Messrs. Dows, Scott and Porter are directors of the Chicago & Northwestern and the Chicago, Rock Island & Pacific. The board re-elected Sidney Dillon President and Elisha Atkins Vice-President, and elected Henry McFarland Secretary and Treasurer, in place of E. H. Rollins, resigned.

Coast Line.—At the annual meeting in Savannah, Ga., March 7, the following directors were chosen: Alfred Haywood, D. Wells, T. H. Harden, M. J. Doyle, D. C. Bacon, T. J. Ruckert, H. Ambon, M. J. Desvergers, D. O'Connor.

Grand Rapids & Indiana.—At the annual meeting in Grand Rapids, Mich., March 7, the old board was re-elected, as follows: W. O. Hughart, H. I. Hollister, Grand Rapids; I. G. Waite, Sturgis, Mich.; Pliny Hoagland, F. P. Randall, Fort Wayne, Ind.; Mancel Talcott, Chicago; Thomas D. Messler, J. N. McCullough, William Thaw, Pittsburgh; John P. Green, George B. Roberts, Thomas A. Scott, R. B. Potter, Philadelphia.

Western North Carolina.—The Governor of North Carolina has nominated and the Senate confirmed the following State directors: Ephraim Clayton, W. P. Roberts, W. T. Dorich, V. V. Richardson, R. H. Battle, Jr., J. I. Scales, A. M. Powell, F. E. Shober, J. L. Robinson. Three directors are to be chosen by the private stockholders.

Bidford, Brownstown & Madison.—At a meeting held in Madison, Ind., March 6, the board elected W. A. Collins President, in place of Hargan, resigned, and Messrs. Jager and Bruning directors, in place of Craig and Phillips, resigned.

Cleveland, Columbus, Cincinnati & Indianapolis.—At the annual meeting in Cleveland, O., March 7, the following directors (one-third of the board) were chosen: L. M. Hubby, Cleveland, O.; B. S. Brown, Columbus, O.; R. M. Shoemaker, Cincinnati; Herman R. Baltzer, New York. They are all re-elected. The board re-elected J. H. Devereux President; H. B. Hurlburt, Vice-President; George H. Russell, Secretary and Treasurer; Alfred Ely, Auditor; E. S. Flint, General Superintendent.

Frederick & Pennsylvania Line.—At a recent meeting Charles E. Trail, John Loats, V. S. Brunner and W. H. Falconer were chosen directors by the stockholders. The Frederick (Md.) City Council has chosen as city directors Jacob D. Hane, Edward Sinn, A. J. Wilcox, T. M. Wolfe and George A. Dennis. The road is leased to the Pennsylvania.

Jackson, Lansing & Saginaw.—At the annual meeting in Jackson, Mich., March 7, the following directors were chosen: H. A. Hayden, P. B. Loomis, W. D. Thompson, Jackson, Mich.; M. McRobert, Mason, Mich.; O. M. Barnes, Lansing, Mich.; James F. Joy, Detroit; Moses Taylor, New York. The road is leased to the Michigan Central.

United States Senate Committee.—The United States Senate committees chosen at the new session, which have relation to railroads or transportation, are as follows: On Railroads.—Senators Mitchell, of Oregon, Chairman; Howe, of Wisconsin; Dawes, of Massachusetts; Dorsey, of Arkansas; Teller, of Colorado; Ferry, of Michigan; Morton, of Indiana; Ransom, of

North Carolina; Bogy, of Missouri; Barnum, of Connecticut, and Lamar, of Mississippi. *On Transportation Routes to the Seaboard.*—Senators Cameron, of Wisconsin, Chairman; Windom, of Minnesota; Conover, of Florida; Burnside, of Rhode Island; Saunders, of Nebraska; Davis, of West Virginia; Harris, of Tennessee; Lamar, of Mississippi, and Beck, of Kentucky. *On Post Offices and Post Roads.*—Senators Hamlin, of Maine, Chairman; Ferry, of Michigan; Jones, of Nevada; Paddock, of Nebraska; Conover, of Florida; Kirkwood, of Iowa; Saulsbury, of Delaware; Maxey, of Texas, and Bailey, of Tennessee. *On Commerce.*—Senators Conkling, of New York, Chairman; Spencer, of Alabama; Burnside, of Rhode Island; McMillan, of Minnesota; Patterson, of South Carolina; Gordon, of Georgia; Dennis, of Maryland; Ransom, of North Carolina, and Randolph, of New Jersey.

Missouri Pacific.—The new board has elected officers as follows:

Philadelphia. The board re-elected Thomas D. Messler President; Joseph S. Davis, Secretary; J. D. Thompson, Treasurer; E. Mize, Auditor; G. A. Jones, Superintendent.

Chicago & Iowa.—At the annual meeting in Chicago, March 7, the old board was re-elected as follows: Amos T. Hall, J. M. Walker, Robert Harris, C. E. Perkins, John E. Blunt, D. B. Shumway, F. E. Hinkley.

Boston, Barre & Gardner.—Mr. George S. Wright, late of the Worcester & Nashua Road, has been appointed Assistant Superintendent, in place of M. S. Creed.

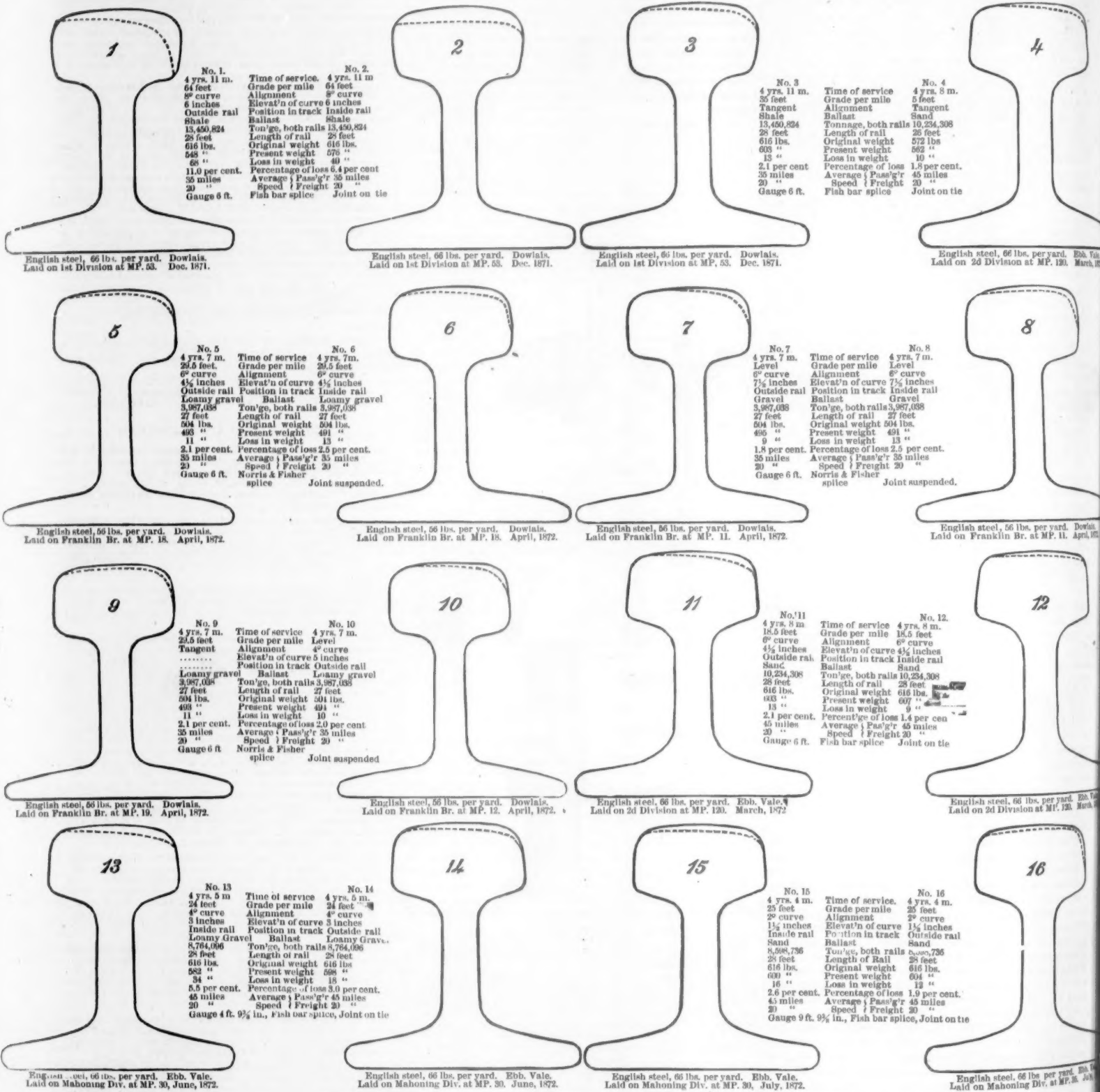
St. Louis, Keokuk & Northwestern.—At the annual meeting in Keokuk, Ia., March 5, the following directors were chosen: A. L. Griffin, H. B. Blood, Keokuk, Ia.; George Edmunds, Carthage, Mo.; John O. Roberts, Clarksville, Mo.; W. H. Harris, Kansas City, Mo.; Amasa Stone, Cleveland, O.; A. B. Stone,

Lemuel S. Jenks, Henry Martin, Wm. H. H. Newman, George R. Potter, James D. Sawyer, James N. Seatcherd, Solomon Scheu, Richard J. Sherman, Charles A. Sweet.

PERSONAL.

—Mr. F. E. Sherman, Auditor of the Chicago, Rock Island & Pacific Company, died suddenly of apoplexy, at the Grand Pacific Hotel in Chicago, on the morning of March 5. He was 55 years old, and entered the company's service as Cashier 22 years ago, becoming Auditor two years later. Mr. Sherman was highly esteemed, both as a railroad officer and a citizen, and his long experience had made him widely known.

—Mr. Oliver Ames died at his residence in Easton, Mass., March 9. He was well known as a large manufacturer, and



WEAR OF STEEL RAILS, ATLANTIC & GREAT WESTERN RAILROAD.

[In each of the sections represented the 'gauge side' is at the right hand of the section.]

Iowa: President, C. K. Garrison, New York; Vice-President, Oliver Garrison, St. Louis; Secretary, C. L. White, New York; Assistant Secretary, George L. Geran, St. Louis.

St. Louis Kansas City & Northern.—The new board has re-elected B. W. Lewis, Jr., President; James F. How, Vice-President and Secretary.

Chicago & Lake Huron.—Mr. F. L. Clark has been appointed Superintendent of the Western Division. Mr. Day K. Smith, General Ticket Agent, will act also as Superintendent of the Eastern Division.

Des Moines River.—E. O. Ormsby, of Emmitsburg, Ia., is President of this new company.

Cleveland, Mt. Vernon & Delaware.—At the annual meeting in Mt. Vernon, O., Feb. 28, the following directors were chosen: Samuel Israel, Charles Cooper, Mt. Vernon, O.; Wm. M. Orr, Orrville, O.; Isaac Harpster, Millersburg, O.; Mardenbro White, Gambier, O.; D. W. Caldwell, Columbus, O.; Thos. D. Messler, Wm. Thaw, Pittsburgh; George B. Roberts, Phila-

delphia. The board re-elected A. B. Stone President; A. L. Griffin, Vice-President and General Manager; H. B. Blood, Secretary and Treasurer; George Edmunds, Attorney.

Atlantic & North Carolina.—On application of the State directors the North Carolina Circuit Court has appointed Major John Hughes Receiver.

General Passenger & Ticket Agents' Association.—At the semi-annual meeting in St. Louis, March 9, the following officers were chosen for the ensuing year: President, H. C. Wentworth, Michigan Central; Vice-President, S. F. Pierson, Cleveland, Columbus, Cincinnati & Indianapolis; Secretary, S. Powell, Chicago, Burlington & Quincy.

Cincinnati, Hamilton & Dayton.—Mr. Samuel A. Medary, late Cashier, has been appointed Paymaster, in place of M. L. Ewing, resigned.

Buffalo & Jamestown.—At the annual meeting in Buffalo, N. Y., March 13, the following directors were chosen: James Adams, Abram Altman, Chilion M. Farrar, Marshal N. Jones,

was for ten years a director of the Union Pacific, and for some time its acting President. He was also a director and large stockholder in the Old Colony Company, and was interested in several Southern roads.

—It is reported that Mr. F. H. Short has resigned his position as President of the Cincinnati, Hamilton & Dayton Company, to take effect April 1. Mr. Short succeeded the late D. McLaren three years ago, having previously been Secretary and Treasurer for a number of years.

—It is reported that Mr. G. J. Foreacre, General Manager of the Virginia Midland road, will soon resign that position to accept that of General Manager of the Atlanta & Richmond Air Line.

—Gen. A. J. Warner, President and Receiver of the Marietta, Pittsburgh & Cleveland, is prominently named as a candidate for Lieutenant Governor of Ohio.

—Mr. Nichol Graham, formerly Master Mechanic of the Hampton shop of the Delaware, Lackawanna & Western, and

lately on the Rensselaer & Saratoga road, sailed recently for Australia, in charge of the locomotives which the Rogers Locomotive Works have built for a road in that country. He expects to remain there at least a year, putting up and running engines in Australia and New Zealand.

—Probably the only bishop in the United States, who is also a railroad director, is Bishop John Sharp, of the Mormon Church, who is a director of the Union Pacific, and of the Utah Central and Southern.

—Maj. R. A. Anderson, of Atlanta, Ga., General Freight Agent of the Western & Atlantic road, was married last week to Miss Wallace, daughter of Mr. Campbell Wallace, of Savannah.

—Mr. J. Calvin Spaulding has resigned his position as General Ticket Agent of the Boston, Barre & Gardner Railroad.

—Mr. Wm. A. Green, formerly for several years General Passenger Agent of the Illinois Central, died recently at his residence in Waukegan, Ill. He had been for some years retired from all active business.

Wear of Steel Rails on the Atlantic & Great Western Railroad.

An investigation into the comparative wear of steel rails on curves, tangents and grades, and a general comparison of the wear of steel and iron rails, made under the direction of

The percentage of loss is the loss in weight compared with the original weight.

The speed of passenger trains is taken at a mean between the maximum and minimum rates, while that of the freight

TIME.	Temperature (Fahrenheit).			Rain and snow, inches.
	Max.	Min.	Mean.	
Oct. 1, 1872, to April 1, 1873.....	83°	-17°	32.2°	a 14.64
April 1, 1873, to Oct. 1, 1873.....	91°	31°	63.0°	23.12
Oct. 1, 1873, to April 1, 1874.....	79°	8°	37.6°	b 20.34
April 1, 1874, to Oct. 1, 1874.....	96°	22°	63.2°	18.22
Oct. 1, 1874, to April 1, 1875.....	76°	-13°	31.7°	b 10.82
April 1, 1875, to Oct. 1, 1875.....	92°	13°	59.3°	21.47
Oct. 1, 1875, to April 1, 1876.....	76°	0°	36.4°	b 20.68
April 1, 1876, to Oct. 1, 1876.....	91°	23°	62.1°	22.31
Oct. 1, 1876, to Jan. 1, 1877.....	75°	-5°	36.4°	a 8.19

a Rails wore out very fast during these two winters.

b Rails wore out but little during these three winters.

trains is from an accurate record of the speed kept in the offices of the division superintendents. This latter has been made possible within two years past by the introduction of a speed

recorder, before which time the freight trains ran irregularly, sometimes attaining quite high rates of speed.

In Pine valley, where sections 1 and 2 were obtained, the full life of an iron rail was six months. This, however, may be considered a special case, as at this place a severer test is brought upon a rail than at any other part of the line, as will be seen by reference to the diagrams. Taking this into consideration, and the fact that the rails have been in the track four years and eleven months, and have not been removed during that time, and reasoning that the rail is good for three years' more service, the proportion of the wear may be put down as 16 to 1 in favor of the steel rails.

From observation and comparison of steel and iron rails over the entire line, taking into consideration any improper care, lack or quality of ballast, effect of temperature and weather, it may be safely stated that the least proportion of wear cannot be less than 7 to 1 in favor of steel rails over the best iron rails on this road; but under the most favorable circumstances it is possible that the proportion will reach 20 to 1.

As climate enters largely into the consideration of the wear of rails, it may be well at this point to give an idea of the geographical position of the road that comparisons may be more closely made.

The general direction of the main line is northeast and southwest, running from Salamanca, N. Y., to Dayton, Ohio, passing through a country variable in climate and subject to extremes of heat and cold, together with heavy snows.

The record of temperature and snow and rainfall here appended is taken from the United States Signal Office at Cleveland, Ohio, and may be considered a fair average for the entire line, although during the winters of 1872-73 and 1874-75 much lower temperatures were reached on some parts of the line than here stated—the mercury ranging as low as 30° Fahrenheit.

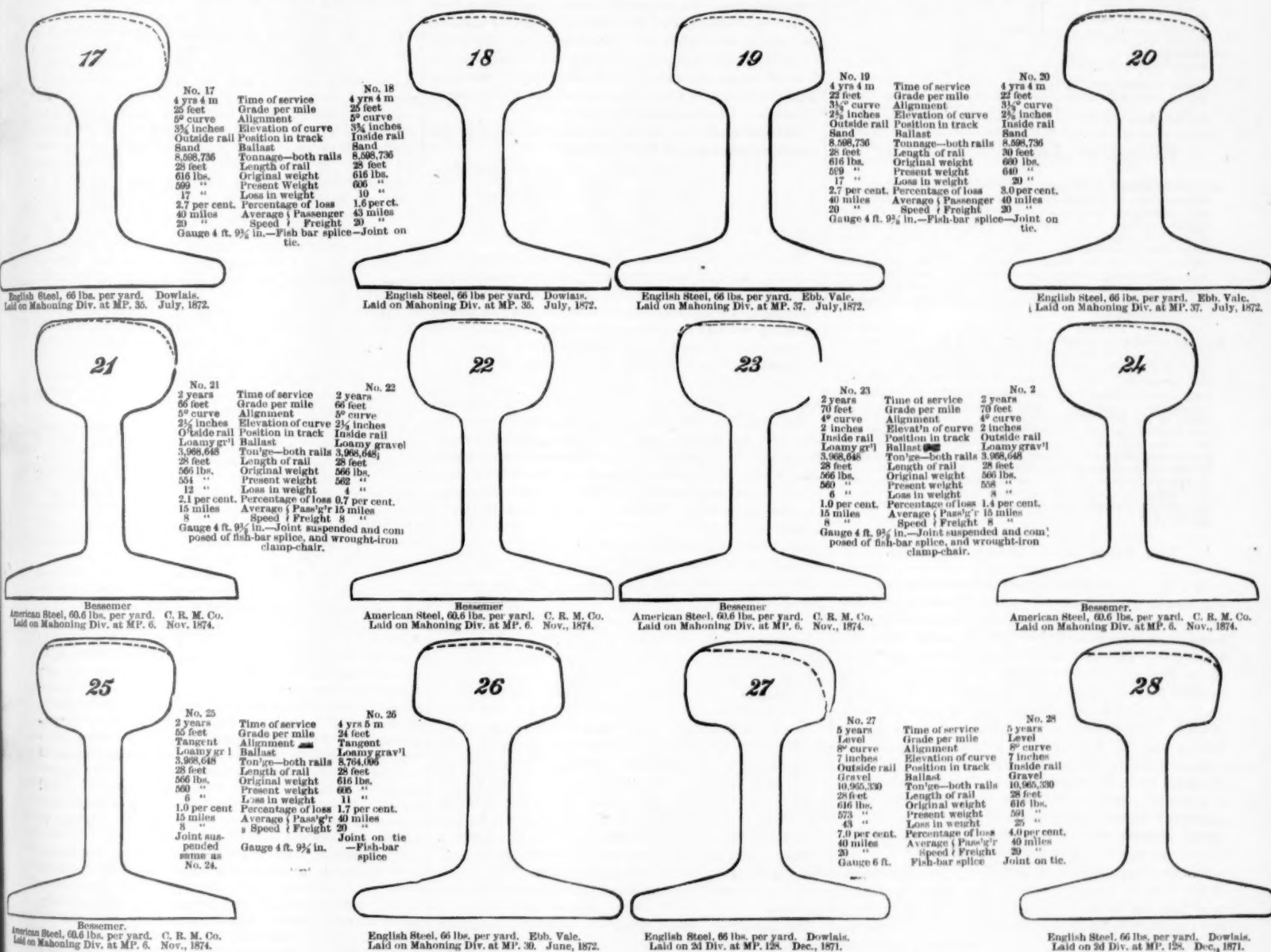
RAILROAD LAW.

Maine Railroad Legislation.

Among the laws passed by the Maine Legislature at its late session was one providing that railroad companies shall require from contractors for the construction of a road sufficient security for payment of wages; failing to do so the company shall be liable for wages left unpaid.

An amendment to the general railroad law provides that no new road shall be located or built running in the same general direction of any other railroad already built, or in process of construction, within ten miles of such other railroad, without special permission of the Legislature.

An amendment to the law regulating crossings authorizes town authorities, when a railroad company fails to keep highway bridges over its road in order, or to build them when re-



WEAR OF STEEL RAILS, ATLANTIC & GREAT WESTERN RAILROAD.

[In each of the sections represented the "gauge side" is at the right hand of the section.]

Chas. Latimer, Chief Engineer, for the report of the Road-masters' meeting, held at Kent, Ohio, Oct. 26, 1876, by Henry C. Thompson, Assistant Engineer of the Atlantic & Great Western Railroad.

In compiling the numerous points of this investigation the design has been to carefully consider all the conditions obtaining, that the results should be reliable and sufficiently in detail to afford information of a practical nature.

The diagrams are taken from sections of the worn rails represented, which rails are now in the tracks.

The time of service is the actual time the rails have been in use at the points designated in the diagrams, as appears by the records in the Engineer's office.

The grade per mile and alignments are from an accurate survey of the line made within the past four years.

The tonnage is taken from the records of the Car Accountant's office and is computed upon the following basis of weights of rolling stock: Locomotives 60 tons, coaches 20 tons, sleeping cars 30 tons, baggage cars 18 tons, loaded freight cars 18½ tons, empty freight cars 8½ tons, cabooses 8 tons.

The original weight of rail is obtained from a record of the absolute weight of same before being laid. The loss in weight is computed from the sections and compares favorably with that obtained by weighing the rails taken from the track.

recorder, before which time the freight trains ran irregularly, sometimes attaining quite high rates of speed.

In Pine valley, where sections 1 and 2 were obtained, the full life of an iron rail was six months. This, however, may be considered a special case, as at this place a severer test is brought upon a rail than at any other part of the line, as will be seen by reference to the diagrams. Taking this into consideration, and the fact that the rails have been in the track four years and eleven months, and have not been removed during that time, and reasoning that the rail is good for three years' more service, the proportion of the wear may be put down as 16 to 1 in favor of the steel rails.

From observation and comparison of steel and iron rails over the entire line, taking into consideration any improper care, lack or quality of ballast, effect of temperature and weather, it may be safely stated that the least proportion of wear cannot be less than 7 to 1 in favor of steel rails over the best iron rails on this road; but under the most favorable circumstances it is possible that the proportion will reach 20 to 1.

As climate enters largely into the consideration of the wear of rails, it may be well at this point to give an idea of the geographical position of the road that comparisons may be more closely made.

The general direction of the main line is northeast and

quired, on due notice given, either to do the work themselves and then require payment from the company, or to apply to any justice of the Supreme Court for such injunction or order as he may deem necessary in the case.

Another act requires all companies to erect and maintain suitable bridge guards at every bridge or other structure, any portion of which crosses the railroad less than eighteen feet above the track, such guards to be approved by the Railroad Commissioners, and to be erected and adjusted to their satisfaction. A fine of \$50 is provided for failure to put up such guards, and of \$100 for willfully breaking them down.

An amendment to the general law requires the Railroad Commissioners to prepare a form of annual report in substance the same as that submitted by them to the Legislature in the appendix to their last report. All the companies of the State shall hereafter make their returns according to the new form and for the year ending Sept. 30. The form of return is that agreed upon by the Railroad Commissioners of the New England States, for the purpose of securing uniformity throughout New England as far as possible.

Street Bridges Over Railroads.

In the case of the City of Baltimore against the Northern Central Company, the Maryland Court of Appeals has decided that where a new street or highway is built or extended over the track of a railroad already in existence, in such manner that a bridge or viaduct is required, there is no obligation upon the company to build such bridge. The company must allow the erection of a suitable bridge, but the cost of the structure must be paid by the city or town which builds the street.



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Editorial Announcements.

Advertisements.—We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay, except in the ADVERTISING COLUMNS. We give in our editorial columns OUR OWN opinions, and those only, and in our news columns present only such matter as we consider interesting and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.

Contributions.—Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies, the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and in their management, particulars as to the business of railroads, and suggestions as to its improvement. Discussions of subjects pertaining to ALL DEPARTMENTS of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.

THE ATLANTIC & GREAT WESTERN.

The Receiver of this company has made his report for the calendar year 1876, also covering the whole period of the receivership, from Dec. 10, 1874. The property in his hands is represented by \$35,000,000 of capital stock and \$56,500,000 of funded debt. Based upon its capital account, therefore, it would appear to be one of the most valuable railroad properties in the country. It is not a very large one, for the company owns but about 420 miles of road; and it is not a very complete and costly one, for there is little second track and not much steel rail, and no costly city termini are on the road; neither is it heavily equipped, but quite the contrary, for one-third of its car equipment is hired at a fixed rental. Indeed, we might almost say that the only great thing about the road is its capital account, which is at the rate of \$218,000 per mile of road owned, \$134,500 of which is funded debt.

The Receiver's report for 1876 shows that the income of this property, thus represented by a capital account of more than ninety millions, was, after paying all expenses and rentals, \$155,300, and for the whole period of the receivership (two years and 22 days), \$446,160, equivalent last year to one-sixth of one per cent. on the whole capital, and to less than one-fourth of one per cent. on the funded debt.

The statement of the capital account per mile is sufficient to account for the failure of the road to pay interest on its obligations. To do this is required an available net income of about \$4,000,000, instead of \$155,000 as last year; and to earn \$4,000,000 net above rentals at last year's rate of profit would require a traffic fully as great as that of the 963 miles of Pennsylvania Railroad and branches during 1876. That is, the road of the heaviest traffic in America, in the year of its heaviest traffic, with nearly twice the mileage worked by the Atlantic & Great Western, would have barely earned enough to cover the interest charge of the latter company at its rate of profit. Or, to put it in another form, the Atlantic & Great Western would have required a traffic per mile of road twice as great as the Pennsylvania's and six times as great as its actual traffic, in order to earn interest on the whole of its enormous debt.

Investors who expect a return on such an exaggerated capital are doomed to disappointment. Still, it would not have required absolutely high rates on freight traffic to have given them all their interest. If the road could have collected 3 cents per mile from all its passengers

and 2 cents from its freight, the \$4,000,000 would have been made up. These are not high rates in many places. The freight rate, especially, is not far from that which the roads from Chicago westward were able to secure but recently, and many lines have a higher one, in Europe as well as in America; but it is simply impossible for a road situated like the Atlantic & Great Western ever to get such a rate, and it is folly to hope for it. It competes for nearly all its traffic with roads which can make satisfactory profits at a lower rate, and it must accept what they take—usually, as it is now situated, a little less.

Nevertheless, the rate of last year was abnormally low, leaving probably every line in the district served by the Atlantic & Great Western with unsatisfactory profits, even when their capital accounts are light.

The rates being out of the power of the Receiver to control, the proprietors of the railroad will find their best means of judging of his efficiency in the economy with which, under the circumstances, he does the work of the road. It is not a line which is calculated to conduct traffic with the greatest cheapness. Its traffic is large, but not comparable with that of the trunk lines further east; it has for years lacked the capital needed to make it thoroughly efficient; it is of exceptional gauge and so has to incur transfer charges which most other lines avoid; it is for the most part a single-track road, and it especially lacks the steel rails which have done so much to promote economy in maintenance of late years.

Now the receipt, expenses and profit per ton and per passenger per mile have been, in cents:

	Per ton mile.			Per passenger mile.		
	Receipt.	Cost.	Profit.	Receipt.	Cost.	Profit.
1872	1.624	1.299	0.325	2.612	2.090	0.522
1873	1.599	1.044	0.555	2.628	2.065	0.563
1874	1.217	0.971	0.246	2.370	1.516	0.854
1875	1.015	0.831	0.184	2.367	1.880	0.787
1876	0.906	0.774	0.132	2.041	1.340	0.701

The cost of transportation has thus been reduced continually. Freight was carried at 7 per cent. less cost and passengers at 15 per cent. less in 1876 than in 1875, and the reduction since 1872 has been 40 per cent. on freight and 36 per cent. on passengers. But the reduction in rates has been so much greater that the profit per ton per mile was 29 per cent. less than in 1875 and 11 per cent. less per passenger mile. Traffic increased a little, but not nearly enough to make up for the reduction in profits.

A railroad war like that of last year, which tries the strongest companies, must inevitably prove disastrous to one like the Atlantic & Great Western, which had so small a margin of profit to support it. As we have seen, it had the comparative trifle of \$155,300 left after paying expenses and rentals. This is but 2.3 per cent. of the receipts.

As an aid to a conclusion as to the economy in working which resulted in the expenses above, we give below the expenses on some other railroads for the last year reported:

	Per ton.	Cost per mile.	Per passenger.
Pennsylvania	0.582 ct.	1.029 cts.	
New York Central	0.710 "	1.090 "	
Erie	0.888 "	1.884 "	
Norfolk Central	0.911 "	2.105 "	
Boston & Albany	0.850 "	1.600 "	
Illinois Central	0.978 "	1.712 "	
Chicago & Alton	0.878 "	1.598 "	

The three lines first named have a very much greater traffic than the Atlantic, and the first two are provided with almost every appliance attainable by money for economical working. The cheapness with which the Atlantic & Great Western was worked is really remarkable, and it shows that the lack of profit was not due to the cost of working, but solely to the extremely low rates received. Those for freight, which forms the great bulk of the business of the road, were lower than on the Erie or the New York Central, and but little higher than on the Pennsylvania.

The Receiver's report is a very elaborate document, and it will enable the security-holders to know just what their property has earned, and the disposition of those earnings in the minutest particulars. This is especially desirable in the case of such a property, which is owned chiefly abroad and is in course of reorganization. Those who have it in their power to dispose of this property may learn from this report what they can reasonably expect from it. Evidently, it will not be safe to impose upon it any considerable fixed interest charge, unless at the same time the earning capacity of the line is improved. This can be done by providing it an equipment of its own at the low prices now prevailing, by changing its gauge to the standard, and by renewing its track with steel. These improvements are indispensable to enable the road to be worked with the greatest economy; they are already possessed by the competitors of this road; and it is only by keeping down expenses that profits can be had, as the rates are quite beyond the control of the company. Any delay in the reorganization based upon the claim that the bondholders are asked to give up too much by the terms of the plan is simple folly. The road can be sure only of a very small net income: reorganization with a large fixed interest charge is sure to result in another bankruptcy and probably years more of delay in making the best use of the property.

Annual Conventions.

In another column will be found the announcements of the annual conventions of several of the associations which hold their meetings in the spring. Attention is called to a special notice of the Supervisory Committee of the Master Mechanics' Association, which announces a change in the time of holding the meeting from May 8 to May 15. The committee also make some very wholesome comment on the prosperity of the association, and there is nothing truer than the fact that, "as a whole, it can only be what each individual member as a part makes it."

The elements which promote or mar the prosperity and usefulness of such organizations are well worth studying. The latter are formed for one or two purposes—either to promote the interests of a class, separate from the rest of the community, or for the general good. Organizations which belong to the former class have their uses, such as trades-unions, associations of persons engaged in one branch of business to control prices, or of freight agents to fix rates of freight; but these cannot be classed in "liberal" professions. The dictionary and definitions of words sometimes throw very strong light on ideas which would otherwise be hazy. Now we sometimes hear of a "liberal profession," to which phrase perhaps we are not accustomed to affix any very distinct ideas. If we refer to the dictionary we find that one of the meanings of liberal is "not selfish, narrow, or contracted; catholic; embracing other interests than one's own." If this meaning is applied to a profession, it will be seen that it at once makes a broad distinction between many of the occupations in life. The medical profession is liberal, because its object is to cure the physical ills of mankind. The distinction too is recognized more clearly by the members of that profession, perhaps than any other. To exclude their brethren in any way from using methods of practice or discovery, by keeping them secret or by taking out patents, is considered unprofessional. Similar rules prevail among lawyers and scientists. It is plain, however, that the man who is trying to "make a corner" in wheat or corn is not engaged in a liberal profession, because he is not "embracing any other interests than his own." Neither is the horse jockey who hides the defects of the animal he offers for sale, nor the stock-broker who circulates reports for the purpose of "bearing" or "bulling" the market. In all of these the object aimed at is to acquire some benefit by depriving some one else of it. In a liberal profession it is to effect something which will be for the good of all. It is not necessary to apply the principle any further, but the distinction should be noted that neither a profession nor a society can be both selfish and liberal at the same time.

Now, one of the great evils of all associations, such as those whose meetings are announced, is that they in some way or other are deprived of their character of liberality. Some person or some clique undertakes to use the society for effecting some selfish end, and those who have become members in good faith soon find that they are used as pawns, or rather counters, to mark off the points gained by those who are really playing the game. Often resistance costs too much in time and trouble, and the advantage to be gained is too slight to justify those who feel that they are wronged in showing fight; so they quietly withdraw with out assigning any reason, because they find it much easier to allow those in possession to hold their places than to dispute or try to deprive them of their title. A policy of conducting the affairs of an association by a board or committee which does not make its action obvious to the members is also very apt to give great dissatisfaction. The cry of "ring" management or the control of a "clique," although perhaps not felt by those who hear the cry, soon excites suspicion, and few persons are disposed to submit meekly to be led by a power whose authority is exercised in a sort of secret and autocratic way. It is almost absolutely necessary that the affairs of a voluntary association should be conducted and administered by a small body or committee, but that board of control, or whatever it may be, should report its action frequently and obviously, so that the members may know what is being done.

An association, too, is somewhat like a nation: it is absolutely necessary to introduce a supply of young and fresh blood. It should, therefore, be the aim of those who direct it to bring forward members who are not in the habit of taking part in the proceedings, and at the same time to suppress the wind-bags; but the latter must be recognized as a matter of extreme difficulty. Members soon grow weary of having the same parties take the lead in proceedings. Few persons have sufficient versatility to be interesting at all times. All of us have certain paths of thought, from which we seldom wander very far. A new man is apt to bring new ways of thinking on a subject, and often of bringing forward new subjects. In the Car-Builders' Association, the plan of setting apart a certain time for hearing and considering questions proposed by any one inclined to present them has been very successful. It has introduced new subjects for consideration, and added very materially to the interest of the meetings.

There is one class of men, however, who probably more than any other are a hindrance to the success of such organizations. These are the depreciatory men, who do nothing themselves and who sneer at everything which other people do. They are the men who, when they become members of such organizations, feel as they do when they go to a theatre, that they have acquired a right to be entertained. They expect the officers to raise the curtain and the performance to be conducted for their amusement alone, never feeling that they are under any obligations to contribute to the proceedings, but that they can wrap themselves in their mantles of dignity, and assume a critical and censorious attitude, and condemn everything which does not come up to their ideas of perfection. Associations never are all that they might be, but always fall very short of it. Anyone who has ever taken any part in affairs which are conducted by any organized body of men knows that the thing to do under such circumstances is to act as

people do when they build houses, that is, make the best use of the timber and other material on hand. So in a society, it is just as impossible to make the membership all that may be desired as it would be to wait for the trees to grow to make timber for a new house. All the societies, of whose meetings we have given notice, are composed of members who occupy certain positions, or are engaged in certain lines of business. They are the material of which such organizations must be formed. It is impossible to discharge all the master mechanics or car-builders, or any portion of them, because they do not come up to the ideal of what such men should be; but what those who are interested in the objects of their respective organizations should do is to try and make them as interesting and useful as is possible with the material on hand. The production of civil engineers, master mechanics and master car-builders to order is a slow process, although the technical schools have accelerated the growth and increased the product of the former immensely during the past few years.

Those who are disposed to ask "what does it all amount to" are therefore requested to bear in mind that meetings of this kind never would amount to anything if none of the members gave a helping hand. We believe no maledictions are visited upon the heads of those who are asked for contributions to be used for "liberal" ends and who give little, but those who give nothing are utterly profitless and barren and are in a bad way. The question therefore which we mean that every member of the associations whose welfare we have been discussing should ask himself is, Have I given or done anything? If not, then are you utterly profitless and useless yourself, and have no right to complain or find fault.

The Houston & Texas Central.

Application has been made for a receiver for this road, under peculiar circumstances. The road has a larger traffic than any other Texas railroad, save one short one, and a growing traffic; its receipts were larger in 1876 than ever before, and its expenses less in proportion than before; the net earnings exceeded the interest charge for the year by fully one-third, and there was no increase in funded debt reported. The company late in the year made an extension of one of its branches, which certainly would not be regarded as an indication of financial weakness; for in these days railroad construction is not begun on the chances of selling new bonds. The reports of the company, however, have been very meagre, and no statement of floating debt has been made. The only obvious occasions for incurring debt were the change of gauge of part of the line last summer (which ought not to have been very costly, as there was not much rolling stock to change), and the extension of the Waco Branch, not yet completed. The funded debt of the company is comparatively light, and consists of several classes of bonds, namely:

7 per cent. gold bonds secured by a first mortgage on the 243 miles of main line from Houston north to the Red River, and by the land grant (\$18,155 per mile).....	\$6,227,000
7 per cent. gold bonds secured by a first mortgage on the 118 miles of the Western Division, from Hempstead west to Austin (\$19,534 per mile).....	2,305,000
7 per cent. gold bonds secured by a first mortgage on the Waco Tap at the rate of \$20,000 per mile, from Bremond northwest 42 miles to Waco (none reported for extension).....	940,000
8 per cent. currency bonds, secured by a mortgage on the entire property, except the Waco Tap, coming next after the above mortgages, and intended to retire the above bonds (\$6,213 per mile by last report).....	2,864,000
Total (\$24,280 per mile).....	\$12,336,000

The entire issues under first mortgages were at the rate of \$18,646 per mile of road before the recent extension, which cannot have changed it materially, if \$20,000 per mile was issued as authorized. Then the payments required before reaching the consolidated mortgage require about \$1,905 gold, or \$1,375 currency, per mile of road, and the consolidated bonds take about \$500 per mile. The net earnings of 1875 were \$2,254 and those of 1876 \$2,450 per mile. There would thus appear to be an abundant margin for the first-mortgage bonds (last year nearly 80 per cent. more than their interest), and a sufficient one for the consolidated bonds (last year more than twice their interest after paying the first-mortgage coupons). There has been no default in the payment of interest as yet. The last first-mortgage coupons were paid Jan. 1, the last consolidated coupons Oct. 1.

The road until recently seemed quite independent of the other Texas railroads, and was largely controlled in Texas, apparently. Not long ago a number of New York capitalists, several of whom are interested in the Houston & Great Northern and the International railroads, were admitted to its board of directors—Messrs. Wm. E. Dodge, Moses Taylor, Wm. M. Rice, John I. Blair and John J. Cisco. The securities of the company have not been a popular investment in the North, it is said, and probably the directors are the largest holders of them.

The latest news is that the application for a receiver was strongly opposed by the Texas interest, and that it was believed in Houston that the floating debt would be so provided for that there would be no occasion for one; but we have not seen any statement of the amount of the floating debt or of the purposes for which it was incurred.

A French Comparison of Chilled and Wrought-Iron Car-Wheels.

The discussion concerning the material for car wheels has extended to France, where M. Hippolyte Fontaine, who represented *La Revue Industrielle* at the Philadelphia Exhibition, gives in his paper an article intended to show that the wrought-iron wheels used in France, such as those exhibited by M. Arbel and Brunon freres at Philadelphia, are much more economical than American chilled cast-iron wheels; and he expresses the opinion that the use of the latter will some day be abandoned in this country, and urges that French manufacturers should exert themselves to secure the American market for their products, which otherwise he thinks likely to

be obtained by German wheel-makers. The calculations by which it is sought to establish the superior economy of wrought-iron wheels are vitiated by the failure to include interest on either class of wheels, but the article makes some statements of facts concerning the service, price, etc., of wrought-iron wheels which will be of general interest here and enable us to make comparisons for ourselves. They are as follows:

"Wrought-iron wheels with tires also of wrought iron can run 93,000 miles before it is necessary to turn off the tires, and 217,000 miles before the tire is worn out, and more than 1,240,000 miles before the wheel itself is worn out. With steel tires, these figures are sometimes a little smaller [?], as may be seen by the statement below, which is sent to us by the Chief Engineer of Rolling Stock of a French company:

Diameter of the smallest wheels in use, at the tread.....	37 in.
Thickness of the new tire turned inside.....	2 3/4 in.
Thickness of the worn-out tire.....	1 in.
Weight of new turned tire.....	396 lbs.
" " old worn-out tire.....	231 lbs.
Cost of new turned tire.....	\$12 03
Value of old worn-out tire.....	2 33
Weight of turned iron wheel.....	286 lbs.
Cost of turned iron wheel.....	\$11 25
Total cost of tire and wheel.....	23 28
Average mileage of cast-steel tire.....	124,000 miles.
Average mileage of wrought-iron wheel.....	1,240,000 miles.
Tires are turned at the tread on an average about.....	4 times.
A wrought-iron wheel wears out on an average.....	10 tires.

M. Fontaine proceeds from these data to calculate the cost per kilometre run for the 2,000,000 kilometres which form the average mileage of a wheel by the following simple process:

Turned wrought-iron wheel.....	\$11 25
Ten steel tires.....	190 30
Turning, removing and setting these tires.....	25 00
Total.....	\$156 55
Deduct value of 10 old tires.....	23 30

Cost per 2,000,000 kil. (1,240,000 miles).....\$133 25 which gives an average cost of 0.01075 cent per mile run, or \$5.37 1/2 for 50,000 miles, on the assumed life of a cast-iron wheel.

In his comparison, M. Fontaine takes \$17 as the average cost of a chilled cast-iron car wheel, 50,000 miles as its average service, and \$3.20 as the (maximum) value of the old wheel; whence he concludes that the cost of service is \$13.80 for 50,000 miles, or two and a half times the cost of wrought-iron wheel service.

One of the most notable statements of this article is the small cost of the steel-tired wrought iron wheel (\$23.28 against \$56 on the Baltimore & Ohio); which is the more surprising because prices of metals are higher in France than in England, Belgium or Germany. Another is the very small mileage of the steel-tire (124,000 miles). This is the more remarkable because M. Fontaine states the life of a wrought iron tire as 217,000 miles; and his statement of the average mileage of such a wheel before turning (93,000 miles) is confirmed by other data. This makes the statement of 124,000 miles as the average service of a steel tire appear suspicious, though the statement of the rolling-stock engineer of a French railroad ought to be accurate and founded on abundant experience; for the French railroad systems are among the largest in the world, and have been worked for a long period under the direction of a trained technical staff which does not usually err on the side of insufficient records. This short run, moreover, is said to require an average of four turnings of the tire, or only 31,000 miles per turning, which is quite contrary to other reported experience.

The St. Louis & Iron Mountain Election.

The St. Louis & Iron Mountain Company was to hold an election for directors last week, but in consequence of a dispute as to who had authority to vote 25,000 of the shares an injunction was had and the election postponed. It seems that when the company first made default in payment of interest on its bonds, and the bondholders consequently had a legal right to foreclose their mortgage, negotiations were had with Baring Bros. & Co., the London bankers, as the representatives of holders of some millions of the bonds, and with their agents in this country, Messrs. S. G. & G. C. Ward, which resulted in the acceptance of the arrangement by which certain coupons were to be funded for a time. It seems that one of the conditions of acceptance of the funding scheme by the Barings was a contract by which Thomas Allen and Henry G. Marquand, the President and Vice-President of the railroad company and the chief owners of the stock, contracted to give to Baring Brothers & Co. "powers of attorney for voting at any and all elections of directors of the St. Louis, Iron Mountain & Southern Railway Company" upon 25,000 of their shares (12,500 each) "to be irrevocable for the full term of time, commencing at the date of these presents, and ending six months after the resumption of payments of the interest coupons on the various issues of mortgage bonds of said company." The consideration of this contract was stated to be the "benefits which have accrued to said Allen and Marquand by reason of the assent of said Baring Brothers & Co. to the funding of the coupons of St. Louis, Iron Mountain & Southern Railway Company," which of course may have been a very valuable consideration for them, as it made it practicable to save from annihilation the stock of which they were large owners. This contract was dated in April, 1875. In accordance with this contract certificates for 25,000 shares of stock were delivered to Baring Brothers & Co., and S. G. & G. C. Ward, their attorneys, receipted for these certificates and the proxies for voting on them as "to be held upon the terms and conditions in said contract mentioned."

On the 19th of February last Messrs. Allen and Marquand made a written demand that the trust be cancelled and the share certificates returned to them, grounding their demand on the statement that the shares were put into the Barings' hands "for the use and benefit of the undersigned," that "the uses and purposes of said trust should be to prevent the said shares from being disposed of and to maintain the power of co-operation in the preservation and management of the said railway, and to keep the control thereof where it then was and now is;" and

that they believe that the trustees are using the power thereby temporarily conferred to the detriment of the interests of the owners of the shares meaning of course that the Barings proposed to use the voting power of these shares to choose a new board of directors and remove Allen and Marquand, the present managers. These gentlemen have also made a statement which has been telegraphed to the New York papers, to the effect that the shares were not deposited as security for the bondholders' interest, but to maintain the control in the present management.

In reply to the demand of Allen and Marquand the agents of the Barings wrote, Feb. 21, that if the object of the trust was to preserve the management in the hands of Allen and Marquand, then it was useless, as it would have remained there quite as surely if Allen and Marquand had kept their stock; that, on the contrary, it was a condition required by certain bondholders, especially Mr. R. B. Minturn, before they would consent to the funding scheme; that it was first proposed to give this voting power to a bondholders' committee in New York, and that it was by way of concession to Allen and Marquand that it was finally vested in the Barings; that the funding scheme was vitally important to the managers not only as giving opportunity to save the stock, but also for discharging the floating debt, in which Allen and Marquand were then largely interested. They say that under this scheme Allen and Marquand reduced by many hundreds of thousands of dollars the amount of unsecured floating debt upon which they were responsible personally; and that this has been done by diverting the net income from the bonds, millions of which were held by the Barings, so that really they have contributed largely to the aid of the company.

It is claimed, we believe, that under the laws of Missouri stock transfers made outside of the State are illegal, and this is one of the grounds advanced in the injunction suit against the Barings.

As the company failed to resume payment of interest under the scheme as it promised, there would seem to be no obstacle to a foreclosure now; but this would be a long and costly affair, and since not all the mortgages are in default, it might not result in transferring the whole road.

The Investments of 1876.

The *Moniteur des Interets Materiels*, of Brussels, publishes a table showing the capital raised during the year 1876 for different purposes in different countries, the issues being divided as to their objects into Government bonds, credit establishments (banks and the like), and capital for railroads and industrial undertakings. The extent to which investments have fallen off of late years is shown most strikingly by the sum of them for each of the past four years, which is stated as follows:

1873.....	\$2,020,000,000
1874.....	841,000,000
1875.....	341,000,000
1876.....	730,000,000

This indicates that the stagnation and want of confidence which so nearly put an end to enterprise after 1873 have had their worst effects, the investments of 1876 having been more than twice as great as those of 1875, though only about one-third of those of 1873. Included in last year's investments, however, are \$300,000,000 United States bonds, which are really a change in form of an old investment, being issued to retire a similar amount of old bonds.

Of the issues of 1876, nearly \$600,000,000, 80 per cent. of the whole, was for Government and municipal loans, but a small part of which is devoted to productive works; \$125,000,000, or 17 per cent. of the whole, was for railroads and other works intended to earn profits. Only \$750,000 of the latter is credited to America; but France is the leading railroad investor, with \$44,000,000; followed by Germany, with \$24,000,000; Great Britain, with \$23,700,000; Switzerland, \$11,400,000; Spain, with \$8,400,000. The list is intended to include the capital raised publicly. As nearly 2,500 miles of railroad were built in this country during the year, there was probably an actual investment of \$50,000,000 in them from some source; and as little or no money was raised abroad for new American railroads, this capital was doubtless obtained at home.

Record of New Railroad Construction.

This number of the *Railroad Gazette* has information of the laying of track on new railroads as follows:

Southern Pacific.—The Yuma Division is extended 20 miles, to a point 180 miles east by south from Los Angeles, Cal.

A CORONER'S VERDICT does not usually carry weight enough to demand attention; but this is not the case with the verdict of the jury which inquired into the death of the victims of the Ashtabula disaster, which we publish this week. This jury has taken time and pains in its inquiry, and has had the benefit, evidently, of the advice of an expert in conducting it, as well as of the testimony, often elaborately prepared, of several capable practical bridge engineers, some of whom made a special study of the design of the bridge and of the wreck. It was a matter of course that it obtained the evidence of the railroad officers. Further, it has evidently sifted the evidence in a manner which we would not expect where a case is not presented by counsel; and more wonderful than all, it has presented its conclusions in a calm, clear, judicial statement not unworthy of a judge on the bench, and certainly not to be expected of a jury, not to say a coroner's jury. The facts concerning the bridge and the other evidence published in our columns will enable our readers to decide how far the conclusions of the jury were justified. We doubt whether there has ever been a more thorough investigation of a railroad accident in this country, notwithstanding the almost total lack of authority and the total lack of funds on the part of the investigating body. This, however, was largely due to the fact that the accident was so interesting to experts in bridge-building that a considerable number visited the scene of the disaster and spent considerable time in studying the structure, all at their own expense. Evidently it will

not do to depend upon such adventitious assistance; but it served very well in this case.

There seems to have been a mistake in drawing up or printing the third clause of the verdict, as the statement beginning "that a great defect, and one which appears in many parts of the structure, was the dependence of every member for its efficient action upon the probability that all or nearly all the others would retain their position, and do the duty for which they were designed," etc., is evidently one of the "following particulars" mentioned further on; and the first sentence should be, "That the fall of the bridge was the result of defects and errors made in designing, constructing and erecting it, as illustrated by the following particulars."

THE BIGGEST WHEEL-MILEAGE YET is reported in the annual report of the Chicago & Alton Railroad for 1876, in which it is stated that the "company has (with few exceptions) constructed, at its shops, all car wheels used under its cars for many years, and care in securing good material and workmanship has resulted in safety and economy to an unusual degree. The average mileage of wheels removed from passenger cars during the year was 64,083 miles, and from freight cars, 118,278 miles!" The latter seems almost incredible, but the report bears evidence of being very carefully made up. Among other items of value we find the aggregate mileage of freight cars is given and also the number of these cars owned by the company. The former is 29,463,386 and the latter 3,080. We have therefore only to divide the former figures by the latter, and we have 9,566 miles as the average annual mileage of its freight cars, or about 26 1/2 miles per day. The average endurance of wheels would therefore be over twelve years. Is there not an error somewhere?

Annual Conventions.

AMERICAN SOCIETY OF CIVIL ENGINEERS.

The ninth annual convention of the American Society of Civil Engineers will be held in New Orleans, Tuesday, April 24.

AMERICAN RAILWAY MASTER MECHANICS' ASSOCIATION.

The following circular has been issued by the Supervisory Committee:

To the members of the American Railway Master Mechanics' Association:

As the constitutional day for the meeting of our annual convention occurs on the 8th of May, it has been suggested that it will be difficult for members to attend so early in the month, and a change to a later date has been deemed advisable. Accordingly the third Tuesday, May 15, has been selected, and by direction of the General Supervisory Committee the annual meeting will take place at that time in the City of St. Louis. A cordial invitation is hereby extended to all master mechanics and superintendents of machinery in the United States and Canada to be present and give the Association their hearty support. The Committee cannot pass the present opportunity of reminding members that the Association as a whole can only be what each individual member as a part makes it.

The committees are composed of able and experienced men, but it remains for the members to contribute the information out of which the reports must be compiled, and it is earnestly requested that each member will give the circulars their immediate attention, that the several chairmen may have sufficient time to make up their reports and have them in the Secretary's office in due season.

H. M. BRITTON, S. J. HAYES,
N. E. CHAPMAN, J. H. SETCHEL,
W. A. ROBINSON, Supervisory Committee.

MASTER CAR BUILDERS' ASSOCIATION.

The eleventh annual convention will be held in Cleveland, Ohio, on Wednesday, June 13.

CAR ACCOUNTANTS' CONVENTION.

The convention appointed for April 25 is to be held April 18 instead, at Indianapolis.

General Railroad News.

THE SCRAP HEAP.

Railroad Manufactures.

The Hanlet Manufacturing Co., of Laconia, N. H., has just closed a contract for 200 cars for the National Despatch Line.

The Cayuta Wheel & Foundry Co.'s works at Waverly, N. Y., are full of work, orders having come in very rapidly since Jan. The company is introducing its wheels into Denmark, having received several orders from that country lately.

The Loomis Nut Lock Washer Co., of Cleveland, O., are receiving extensive orders for their washers. An order has just been filled for washers sufficient for the rail-joints on 70 miles of track for a leading road.

Gardner & Co.'s improved perforated veneer seats have recently been put in two cars for the Cleveland, Columbus, Cincinnati & Indianapolis, four dining cars for the Chicago, Rock Island & Pacific and one for the Central Pacific. They are also being introduced in Sweden, both on steam railroad cars and on the street railroad in Stockholm. For street cars orders have lately been filled for 135 cars on the Third Avenue (New York) road and for 20 cars built by the Starbuck Car & Wagon Co., in England. They are now extensively used for ferry boats and orders have been received for seats for two boats in San Francisco and two belonging to the Pennsylvania Railroad Company.

The Bethlehem (Pa.) Iron Co. has lately added to its business the manufacture of steel axles, the first lot having been made for the Lehigh Valley road.

A. Whitney & Sons, of Philadelphia, are making about 150 car wheels per day.

At the Catocin Furnace, in Frederick County, Md., one stack is in blast, making 50 tons of charcoal iron per week.

At the Rome (N. Y.) Iron Works the bar mill is running steadily full time, but the rail mill has been idle since October last.

The Dutchess Iron Co., at Poughkeepsie, N. Y., is running six puddling furnaces single turn.

The Lackawanna Coal & Iron Co.'s large furnace at Scranton, Pa., made 16,017 tons of Bessemer iron last year. The furnace is 23 feet high and 67 feet high; the fuel used is anthracite coal and the ores a mixture from Crown Point, N. Y., and Franklin Furnace, N. J.

The Pittsburgh Forge & Iron Co.'s works are running steadily single turn.

In 24 working days in February the Edgar Thomson Steel Works made 5,993 1/2 tons of steel ingots, 4,474 1/2 tons of rails and 183 1/2 tons of billets.

Bradley, Reis & Co.'s sheet iron mill at New Castle, Pa., is running full time.

It is said that J. H. Cofrode & Co., bridge-builders, are negotiating for a lease of old Reading Railroad repair shops at

Pottstown, Pa., which are not now in use by the company. The shops are quite large.

The Danforth Locomotive Works, at Paterson, N. J., are building an engine for the Paulinskill Valley road.

G. W. James & Co., bridge-builders, of Milwaukee, Wis., have gone into bankruptcy. The statement of assets and liabilities is not yet completed.

Government Contract for Iron Roof

Proposals will be received by the Bureau of Yards and Docks, Navy Department, at Washington, until March 29 for the construction and erection of an iron roof frame for a storehouse at the League Island Navy Yard, Philadelphia, the building being 65 feet wide and 400 feet long; also for the galvanized iron cornice. Plans and specifications can be seen at the engineer's office, League Island Yard.

TRAFFIC AND EARNINGS.

Railroad Earnings.

Earnings for various periods are reported as follows:

Year ending Dec. 31:	1876.	1875.	Inc. or Dec.	P. c.
Cleveland, Columbus, Cincinnati & Indianapolis.....	\$3,676,458	\$3,774,217	Dec..	97,759 2.6
Expenses.....	2,973,540	2,890,103	Inc..	83,437 2.9
Net earnings.....	\$702,918	\$884,114	Dec..	\$181,196 20.5
Earnings per mile.....	7,797	8,005	Dec..	208 2.6
Per cent. of exps.....	80.88	76.58	Inc..	4.30 5.6
Cleveland, Mt. Vernon & Delaware.....	373,583	426,027	Dec..	52,444 13.2
Expenses.....	310,050	338,361	Dec..	28,311 8.4
Net earnings.....	\$63,533	\$87,666	Dec..	\$24,133 37.5
Earnings per mile.....	2,380	2,714	Dec..	334 12.3
Per cent. of exps.....	82.99	79.42	Inc..	3.57 4.5
International & Gr't Northern.....	1,440,881	1,365,634	Inc..	75,247 5.5
Expenses.....	388,362	760,717	Inc..	82,645 11.0
Net earnings.....	\$1,052,519	\$604,917	Dec..	\$447,602 74.8
Earnings per mile.....	3,059	1,714	Dec..	1,345 78.5
Per cent. of exps.....	57.87	54.96	Inc..	2.91 5.3
St. Louis, Iron Mountain & Southern.....	4,002,045	3,802,941	Inc..	199,104 5.2
Expenses.....	2,035,720	2,013,854	Inc..	21,866 1.1
Net earnings.....	\$1,966,325	\$1,789,087	Inc..	\$177,238 9.9
Earnings per mile.....	5,847	5,552	Inc..	295 5.5
Per cent. of exps.....	50.87	53.00	Dec..	2.13 4.0
West Jersey.....	731,011	659,798	Inc..	71,213 10.8
Expenses.....	463,375	366,510	Inc..	96,865 26.4
Net earnings.....	\$267,636	\$293,288	Dec..	\$25,652 8.7
Earnings per mile.....	5,711	5,148	Inc..	563 10.8
Per cent. of exps.....	63.88	55.55	Inc..	8.33 15.0
Two months ending Feb. 28:	1877.	1876.		
Atchison, Topeka & Santa Fe.....	\$268,827	\$261,549	Inc..	\$7,278 2.8
Burlington, Cedar Rapids & Northern.....	142,058	103,625	Dec..	38,433 37.1
Canada Southern.....	242,934	264,902	Dec..	21,968 8.3
Central Pacific.....	2,076,000	2,011,542	Inc..	64,458 3.2
Chicago & Alton.....	671,496	682,447	Dec..	10,951 1.6
Chicago, Milwaukee & St. Paul.....	780,460	1,044,658	Dec..	264,198 33.7
Denver & Rio Grande.....	85,196	64,187	Inc..	21,009 32.7
Illinois Central, Illinois lines.....	739,905	877,923	Dec..	138,018 18.7
Illinois Central, Iowa lines.....	187,433	253,352	Dec..	65,919 35.0
Indianapolis, Bloomington & Western.....	185,344	276,035	Dec..	90,691 49.2
International & Gr't Northern.....	317,196	256,532	Inc..	60,664 23.7
Missouri, Kansas & Texas.....	472,340	511,181	Dec..	38,841 8.1
St. Louis, Alton & T. H., Belleville Line.....	88,246	78,575	Inc..	9,671 12.3
St. Louis, Iron Mt. & Southern.....	777,400	639,306	Inc..	138,094 21.6
Toledo, Peoria & Warsaw.....	159,150	211,469	Dec..	52,319 32.9
Month of January:				
Atchison, Topeka & Santa Fe.....	\$134,864	\$117,417	Inc..	\$17,447 14.9
Net earnings.....	41,949	45,804	Dec..	3,855 8.4
Per cent. of exps.....	68.90	60.99	Inc..	7.91 13.0
Atlantic & Great Western.....	270,142			
Burlington, Cedar Rapids & Northern.....	73,964	91,934	Dec..	17,970 24.3
Net earnings.....	15,090	29,237	Dec..	14,147 94.4
Per cent. of exps.....	79.56	68.15	Inc..	11.41 16.8
Burlington & Mo. River in Nebraska.....	49,922	51,004	Dec..	1,082 2.1
Net earnings.....	19,741	29,182	Dec..	9,441 47.6
Per cent. of exps.....	66.36	42.79	Inc..	23.57 41.1
Cleveland, Mt. Vernon & Delaware.....	26,244	29,048	Dec..	2,804 10.7
Net earnings.....	2,803	4,557	Dec..	1,754 62.2
Per cent. of exps.....	89.48	84.38	Inc..	5.10 6.0
Houston & Texas Central.....	248,236	304,683	Dec..	56,448 22.7
Net earnings.....	78,285	126,495	Dec..	48,211 61.6
Per cent. of exps.....	68.53	58.42	Inc..	10.11 17.3
Kansas Pacific.....	176,265	206,402	Dec..	30,137 17.1
Net earnings.....	46,257	63,565	Dec..	17,308 37.4
Per cent. of exps.....	73.87	69.20	Inc..	4.57 6.7
Louisville, Paducah & Southwestern.....	33,660	37,946	Dec..	4,286 12.7
Net earnings.....	3,517	4,141	Dec..	624 14.1
Per cent. of exps.....	89.45	88.96	Inc..	0.49 0.6
Nashville, Chattanooga & St. Louis.....	150,466	173,385	Dec..	22,919 15.2
Net earnings.....	63,475	73,300	Dec..	9,825 15.4
Per cent. of exps.....	57.99	57.72	Inc..	0.27 0.5
Paducah & Memphis.....	15,110	21,502	Dec..	6,392 42.3
Net earnings.....	1,230	9,511	Dec..	8,281 672.4
Per cent. of exps.....	92.53	55.77	Inc..	36.76 65.9
St. Paul & Sioux City.....	30,597	41,582	Dec..	10,985 35.9
Net earnings.....	4,963	12,982	Dec..	7,999 161.5
Per cent. of exps.....	83.77	66.75	Inc..	16.02 21.8
Sioux City & St. Paul.....	15,522	27,831	Dec..	12,309 79.3
Deficit, or net earn.	1,098	7,190		
Per cent. of exps.....	107.23	74.25	Inc..	32.98 44.4
Union Pacific.....	815,354	664,987	Inc..	150,367 22.6
Net earnings.....	492,902	192,817	Inc..	300,085 155.6
Per cent. of exps.....	39.55	70.40	Dec..	30.85 43.8
Month of February:				
Atchison, Topeka & Santa Fe.....	\$133,963	\$144,132	Dec..	\$10,169 7.1
Burlington, Cedar Rapids & Northern.....	66,094	101,691	Dec..	35,597 53.9
Canada Southern.....	133,365	141,161	Dec..	7,796 5.8
Central Pacific.....	951,000	1,017,203	Dec..	66,203 6.9
Chicago & Alton.....	335,459	346,850	Dec..	11,391 3.4
Chicago, Milwaukee & St. Paul.....	405,000	517,112	Dec..	112,112 27.7
Den. & Rio Grande.....	41,926	30,508	Inc..	11,418 27.4
Illinois Central, Ill. lines.....	365,067	451,761	Dec..	86,694 23.7
Illinois Central, Iowa lines.....	95,772	125,941	Dec..	30,169 31.5
Indianapolis, Bloomington & Western.....	93,176	142,649	Dec..	49,473 53.1
International & Gr't Northern.....	138,000	116,186	Inc..	21,814 15.8

Louisville & Nashville.....	1877.	1876.		
Missouri, Kansas & Texas.....	421,835	410,394	Inc..	11,442 2.8
St. Louis, Alton & T. H., Belleville Line.....	235,308	254,722	Dec..	19,414 7.8
St. Louis, Iron Mt. & Southern.....	36,833	39,595	Dec..	2,762 7.5
Toledo, Peoria & Warsaw.....	379,900	312,116	Inc..	67,784 21.7
First week in March:				
Atchison, Topeka & Santa Fe.....	\$39,977	\$42,786	Dec..	\$2,809 6.8
Chicago, Milwaukee & St. Paul.....	112,000	136,166	Dec..	24,166 21.7
St. Louis, Iron Mt. & Southern.....	93,200	88,235	Inc..	4,965 5.6
Week ending March 2:				
Great Western, of Canada.....	\$79,295	\$78,162	Inc..	\$1,133 1.4
Week ending March 3:				
Grand Trunk.....	\$182,512	\$180,054	Inc..	\$2,458 1.4

On the February earnings some allowance should be made for the fact that the month last year had 29 days and this year but 28, making a difference of 3.57 per cent.

West-bound Freight Rates.

The rates agreed upon by the trunk lines on freights from New York westward, which went into effect March 12, are as follows:

To Rochester, Buffalo and Jamestown, N. Y., Pittsburgh and Erie, Pa., for the four classes and the special class, 45, 40, 35, 30 and 20 cents per 100 lbs. respectively; to Cleveland and Ravenna, O., 49, 46, 39, 30 and 25 cents; to Detroit and Port Huron, Mich., 53, 49, 42, 32 and 25 cents; to Sandusky, O., 54, 50, 43, 32, 25; to Mansfield, Crestline and Galion, O., 55, 51, 44, 33, 26; to Bellaire, O., Parkersburg and Wheeling, W. Va., and Janesville, O., 57, 53, 46, 34, 27; to Defiance and Toledo, O., 58, 54, 45, 35, 27; to Columbus, Bellefontaine and Newark, O., 60, 56, 48, 36, 28; to Springfield, O., 62, 58, 49, 37, 29; to Jackson, Hillsdale and Jonesville, Mich., 63, 59, 51, 38, 30; to Waterloo, Ind., 64, 60, 51, 38, 30; to Fort Wayne and Kendallville, Ind., 65, 61, 52, 39, 30; to Dayton, Union and Hamilton, O., and Sturgis, Mich., 66, 61, 52, 39, 31; to Nottawa and Three Rivers, Mich., 68, 64, 55, 41, 32; to Schoolcraft, Mich., 69, 65, 55, 42, 33; to Cincinnati, Chillicothe, Portsmouth and Piqua, O., Richmond, South Bend and Anderson, Ind., and Kalamazoo, Lansing and Battle Creek, Mich., 70, 66, 56, 42, 33; to Indianapolis, Logansport and Peru, Ind., and Plainwell, Mich., 71, 67, 57, 43, 33; to Allegan, Mich., 72, 67, 58, 43, 34; to Lafayette, Ind., 74, 69, 59, 44, 34; to Chicago and Joliet, Ill., LaPorte, Ind., Milwaukee, Wis., Grand Rapids, Holland, Muskegon and Grand Haven, Mich., 75, 70, 60, 45, 35; to Danville, Ill., 77, 72, 62, 46, 36; to Madison and Jeffersonville, Ind., 78, 74, 64, 48, 37; to Terre Haute, Ind., 81, 76, 62, 48, 38; to New Albany, Ind., 83, 78, 68, 52, 41; to Peoria, Pekin and Bloomington, Ill., 84, 78, 67, 50, 39; to Shawneetown, Ill., 85, 80, 68, 51, 40; to Louisville, Ky., Decatur and Springfield, Ill., 86, 80, 69, 52, 40; to Vincennes, Ind., and Jacksonville, Ill., 90, 82, 69, 51, 41; to Alton, Sandoval and Mattoon, Ill., 91, 85, 73, 55, 43; to Evansville, Ind., 92, 85, 72, 55, 43; to Vandalia, Cairo and Pana, Ill., 96, 91, 69, 55, 45; to St. Louis, Mo., Quincy, Ill., and Keokuk, Iowa, 97, 91, 79, 61, 49; to Urbana, Ill., 100, 90, 75, 57, 47; to Nashville, Tenn., 125, 115, 100, 69, 56; to Memphis, Tenn., 145, 130, 110, 74, 61.

The rates to leading points above are as follows:

	First class.	Second class.	Third class.	Fourth Special class.
Chicago.....	75	70	60	45
St. Louis.....	97	91	79	61
Indianapolis.....	71	66	57	43
Cincinnati.....	70	64	55	41
Buffalo.....	45	40	35	30

The Chicago rates apply also to Milwaukee, Joliet, Ill., LaPorte, Ind., Holland, Grand Rapids, Grand Haven and Muskegon, Mich.; the St. Louis rates to Quincy, Ill., and Keokuk, Ia.; the Indianapolis rate to Logansport and Peru, Ind., and Plainwell, Mich.; the Cincinnati rate to Chillicothe, Portsmouth and Piqua, O., Richmond, Anderson and South Bend, Ind., and Kalamazoo, Battle Creek and Lansing, Mich., and the Buffalo rate to Rochester and Jamestown, N. Y., and Erie and Pittsburgh, Pa.

Coal Movement.

Coal tonnages for the two months ending March 3 were as follows, the figures being those of the *Engineering and Mining Journal*, and the tonnage in each case being that originating on the line to which it is credited:

On the line to which it is credited:	1877.	1876.	Inc. or Dec.	P. c.
Anthracite:				
Philadelphia & Reading.....	599,180	271,886	Inc..	327,294 120.4
Northern Central, from Shamokin Div. and Summit Branch.....	57,877	28,025	Inc..	29,852 106.5
Central of N. J., Lehigh Division.....	310,494	253,838	Inc..	56,656 22.3
Danville, Hazleton & Wilkesbarre.....	4,022	4,441	Dec..	419 9.4
Lehigh Valley.....	529,745	336,679	Inc..	193,066 57.3
Pennsylvania & New York.....	7,145	3,952	Inc..	3,193 80.8
Delaware, Lackawanna & Western.....	318,264	197,209	Inc..	121,055 61.4
Delaware & Hudson Can- nal Co.....	319,423	244,050	Inc..	75,373 30.9
Pennsylvania Coal Co.....	131,006	179,259	Dec..	48,253 36.9
State Line & Sullivan..	2,064	9,465	Dec..	7,411 78.3
Total anthracite....	2,279,210	1,528,804	Inc..	750,406 49.1
Semi-bituminous:				
Cumberland, all lines..	106,696	143,564	Dec..	36,868 25.7
Huntingdon & Broad Top.....	31,653	37,549	Dec..	15,896 43.3
Tyrose & Clearfield....	223,397	166,263	Inc..	57,134 34.4
Total semi-bitumin's	351,746	347,376	Inc..	4,370 1.3
Bituminous:				
Barclay.....	66,514	62,159	Inc..	4,355 7.9
<p>The Receivers of the Lehigh & Wilkesbarre Coal Company have, it is reported, leased all the company's mines to Mr. Chas. Parrieh, formerly President of the company, he agreeing to mine coal at \$1.25 per ton, the Receivers to provide for its transportation from the mines and its sale.</p> <p>The anthracite coal tonnage of the Belvidere Division, Pennsylvania Railroad, for the two months ending March 3 was as follows:</p>				

day. Over one-third of the whole came from the two stations more than half of the whole quantity was consigned to stations within the State of Michigan; more than one-fifth went to Ohio; and no less than 2,213 car-loads went to places east of Ohio, 99 car-loads to Maine and 2 to Florida—both lumber States. This road does not seem to compete to much extent for the supply of the country served from Lake Michigan. Indiana received 1,172 car-loads, and Illinois 162, and nothing went further west. This indicates to what extent the lumber business, which not many years ago was thought to depend entirely upon the availability of water transportation, has been directed to railroads, which now reach many lumber districts too distant from rafting rivers and navigable lakes ever to make use of them.

ANNUAL REPORTS.

Atlantic & Great Western.

The Receiver, Gen. J. H. Devereux, reports for the year 1876, and for the term of the receivership, which began Dec. 10, 1874. Most of the comparisons are for the year 1876 and the year and 22 days from Dec. 10, 1874, to the close of 1875.

The road in the hands of the Receiver was 502 miles at the beginning of the year—387½ owned from Salamanca, N. Y., to Dayton, O., 81½ miles of the leased Cleveland & Mahoning Valley line from Cleveland, O., to Sharon, Pa., and 33 miles of Franklin Branch from Meadville to Oil City. During the year an extension of the Cleveland & Mahoning Valley line 7½ miles long from Sharon to a junction with the Atlantic & Great Western near Shenango, opening a route for Shenango & Allegheny cars to run through to Cleveland, was partly worked by the Receiver under an agreement for a lease. Previous to 1876 under the receivership trains were run for a time over 60 miles of foreign road, and also for some months two branches of the Mahoning road were worked under a lease. An average of 552 miles of road was worked from Dec. 10, 1874, to the end of 1875, and an average of about 505 miles in 1876. The work of the year was 2,476,656 tons of freight and 288,960,045 tons carried one mile, and 914,351 passengers and 39,091,988 passenger miles. In the comparisons below, the traffic from Dec. 10, 1874, to Dec. 31, 1875, is compared with that from Dec. 10, 1875, to Dec. 31, 1876:

	1876.	1875.	Inc. or Dec.	P. c.
Tons carried.....	2,619,959	2,600,876	Inc.	19,083 0.7
Tonnage mileage.....	307,331,658	304,846,225	Inc.	2,485,433 0.8
Passengers carried.....	970,596	999,930	Dec.	28,434 2.8
Passengers mileage.....	40,856,019	36,969,876	Inc.	4,886,143 13.5

While through passenger traffic was largely stimulated by the Centennial, local was evidently depressed by it. Local passenger mileage was less by 10 per cent., and through passenger mileage greater by 47 per cent.

The earnings and expenses were (1875 including 22 days of 1874):

	1876.	1875.	Inc. or Dec.	P. c.
Gross Earnings.....	\$2,611,116 79	\$3,094,856 17	Dec.	\$483,739 38
Freight earnings.....	790,884 94	851,526 26	Dec.	60,641 32
Passenger ".....	42,224 39	45,567 32	Dec.	3,342 93
Mail ".....	52,291 93	60,926 66	Dec.	14,634 73
Express ".....	49,781 81	49,137 67	Inc.	644 14
Miscellaneous earn.....				
	\$3,546,299 86	\$4,108,014 08	Dec.	\$561,714 22

	1876.	1875.	Inc. or Dec.	P. c.
Operating Expenses:				
Salaries.....	\$104,040 18	\$114,224 29	Dec.	\$10,184 11
General op'ng exps.....	314,282 40	344,068 89	Dec.	29,786 49
Station expenses.....	219,598 05	247,920 36	Dec.	28,322 31
Train ".....	832,547 35	923,138 19	Dec.	90,590 84
Main. of locomotives.....	326,782 76	372,338 59	Dec.	45,555 83
" " cars.....	336,101 43	339,127 28	Dec.	3,025 85
" " buildings.....	575,174 11	712,820 66	Dec.	137,646 55
and docks.....	79,541 12	65,166 96	Inc.	14,374 16
Maint. of fences.....	10,576 20	26,331 36	Dec.	15,755 16
Loss and damage.....	13,714 70	16,272 29	Dec.	2,557 59
Legal expenses.....	7,942 28	17,325 81	Dec.	9,383 53
Profit and loss.....		7 60	Dec.	7 60
	\$2,820,300 58	\$3,178,737 28	Dec.	\$348,436 60

	1876.	1875.	Inc. or Dec.	P. c.
Total net earnings from operation.....	\$716,999 28	\$920,276 90	Dec.	\$203,277 62
Earnings from other sources.....	9,852 26	8,618 88	Inc.	1,233 38
Total net earnings from all sources.....	\$726,851 54	\$928,895 78	Dec.	\$202,044 24

	1876.	1875.	Inc. or Dec.	P. c.
Assets of A. & G. W. R. R. collected in cash by Receiver.....	10,977 48	281,392 28	Dec.	264,414 80
Assets of A. & G. W. R. R. transferred to Receiver.....		377,378 50	Dec.	377,378 50
Total receipts to be accounted for.....	\$743,829 02	\$1,596,666 56	Dec.	\$852,837 54

	1876.	1875.	Inc. or Dec.	P. c.
Expenditures Chargeable against above Receipts:				
Additions.....	\$102,462 89	\$125,743 04	Dec.	\$23,280 15
Liabilities of A. & G. W. R. R. Co. paid.....	234,089 01	1,030,694 72	Dec.	\$796,605 71
Use of foreign cars and engines.....	272,936 85	284,946 55	Dec.	11,999 70
Rent of Cleveland & Mahoning Railroad.....	274,272 00	290,942 38	Dec.	16,670 38
Rent of C. H. & D. R. R. to 26th May, 1875.....		62,354 94	Dec.	62,354 94
Rent of Sharon Branch.....	3,000 00	3,177 42	Dec.	177 42
" Sharon Railway.....	14,791 00		Inc.	14,791 00
" Docks and lots.....	7,492 47	6,055 11	Inc.	1,437 36
General profit and loss.....	6,088 77	19,482 60	Dec.	13,393 83
" expenses.....	26,043 94	26,043 94		
" interest and exchange.....	7,793 23	13,109 22	Dec.	5,315 99
Taxes.....	98,530 66	26,935 33	Inc.	71,595 33
	\$1,046,573 72	\$1,888,626 58	Dec.	\$842,052 86

	1876.	1875.	Inc. or Dec.	P. c.
Excess of expenditures over receipts.....	\$302,744 70	\$291,960 02	Inc.	\$10,784 68

The expenditures included under "Additions" are those for additions to the property in the hands of the Receiver, such as are properly chargeable to capital account.

The working expenses were 77.38 per cent. of the receipts in 1876 and 79.78 per cent. in 1875.

The part of the expenditures belonging properly to fixed charges—including rentals of rolling stock and of leased railroads—was \$571,562.32 in 1876 against \$647,026.40 in 1875, and the surplus of net receipts above these fixed charges was \$155,289.22 in 1876—equivalent to about \$907 per mile of road. In 1875 the income from operation above these fixed charges was \$290,999.38, or \$529 per mile or 387 days, which is at the rate of \$500 per mile per year.

Comparing the system worked before 1876 with the same roads in 1876, including the results of lines not worked by the Receiver in the later year, and for corresponding periods in the case of each road, the earnings and expenses would appear:

	1876.	1875.	Decrease.	P. c.
Gross receipts.....	\$3,926,825 47	\$4,108,014 08	\$181,188 61	4.41
Operating expenses.....	3,117,352 34	3,178,737 28	\$61,384 94	1.93

Net earnings.....\$809,473 13 \$929,276 90 \$119,803 77 12.89

Some of the average results were:

	1876.	1875.	Decrease.	P. c.
No. of cars per freight train.....	15.90	15.70	0.20	1.27
No. of tons of load per car.....	5.98	5.97	0.01	0.17
Per ton per mile.....	0.9065 cts.	1.0152 cts.	0.1087 cts.	12.00
Earnings.....	0.7740 "	0.8213 "	0.0473 "	6.13

Profit.....	0.1325 "	0.1889 "	0.0564 "	42.56
Earnings on local freight.....	1.3090 "	1.4100 "	0.1010 "	7.68
" " through.....	0.6410 "	0.6940 "	0.0530 "	8.28
No. of cars per passenger train.....	4.3	3.6	0.7	16.67
No. of cars per passenger train (except baggage).....	3.2	2.7	0.5	15.38
No. of passengers per car.....	10.6	10.9	0.3	2.82
Per passenger per mile—				
Receipt, local.....	2.729 cts.	2.819 cts.	0.090 cts.	3.29
" through.....	1.461 "	1.741 "	0.280 "	19.17
" average.....	2.041 "	2.367 "	0.326 "	16.00
Expense.....	1.340 "	1.580 "	0.240 "	17.91
Profit.....	0.701 "	0.787 "	0.086 "	12.28

This shows a decrease of 10 per cent. in the average freight rate and of 14 per cent. in the average passenger rate; of 6 per cent. in the freight expense and 15½ per cent. in the passenger expense; and of 29 per cent. in the rate of profit on freight and of 12 per cent. in that of passengers.

Most elaborate accounts, signed by the Auditor, Mr. Thomas Warnock, accompany, or rather form, the report, presenting the condition of the receivership and its results with singular clearness. The balance sheet and income account are very full and thoroughly explained, and in explanation of the expenditure, for "Additions" a detailed statement is made of each item and of the causes which made the expenditure advisable.

THE RECEIVER'S STATEMENT.

The following is a part of the remarks with which Receiver Devereux prefaces the report:

"The results of the past year's operations have been reached through embarrassments beyond precedent in the history of American railroads, and are none the less unfortunate because affecting, in a greater or less degree, the movement generally of competitive rail traffic at all points between the West and East during seven months of the twelve.

"The financial summary of the business of 1876, as to net income, is discouraging; but a careful examination of the tables, with a knowledge of the present condition of the roadway, superstructure and equipment, will show the enduring capacity of the railroad in maintaining itself against specially and exceptionally disadvantageous circumstances, and will, doubtless, strengthen the best hopes of its proprietors as to the ultimate value of their property.

"In the previous annual report comment was made upon the losses arising from business depression, from financial uncertainties, which had attended manufacturing and commercial interests; and also upon the injurious effects of miners' strikes, as to traffic and revenue, all connected with a natural, but unlimited competition in rail transportation, which had steadily reduced the traffic rates to the lowest point ever reached, and which had resulted in an average rate of carriage that was substantially unremunerative and altogether grievous upon a railroad like the Atlantic & Great Western, with its heavy gradients and difficulties of position and gauge.

"And, in such review of the operations of 1875, the hope was expressed that, at last, the scale of freight rates had settled to the minimum, and that it was reasonable to expect, from their improvement, however slow, increased net earnings for the future.

"During the first quarter of 1876 the through rates were held firmly at an advanced figure; and then followed a trunk line war, of so called geographical supremacy—the alleged protection of the sea-board cities, and their relations to the export trade from the West, being the ground and origin of this last and most bitter strife.

"It is not pertinent to enlarge here upon this unfortunate controversy, nor to undertake any expression of views and opinions looking to the possible avoidance and prevention of another occurrence of this generally acknowledged calamity to all railroad interests.

"The Atlantic & Great Western Railroad, measurably isolated, and altogether dependent, in reaching out on the one hand to the common gathering-grounds of freight traffic in the West, and on the other hand to the sea-board, stands comparatively helpless and fettered in questions of rates, which, at the pleasure or jealousy of the great trunk lines, are changed and determined, either amicably or by strife, at the option of their managers alone.

"Recalling the meagre financial outcome of 1875, from the causes just alluded to, it is to be noted that, excessively depressed as were the freight rates of that year, if only the same rates could have been maintained in the movement of the freight and passenger traffic through 1876, the net earnings of 1876 would have been increased \$466,256.20.

"And if there had been obtained during 1876, the average rates upon freight and passengers received between Sept. 1, 1871 (the date of the re-organization of the company), and December, 1875, the net earnings of the year would have been increased \$1,210,101.62.

"During more than one-half of the past year the carriage of a considerable portion of the east-bound traffic has yielded but ½ of one cent per ton per mile, or ½ of a penny in gross revenue; and the west-bound rates on competitive freight from the sea-board, such as coffee and sugar, have been ½ of one cent per ton per mile, or ½ of a penny; and on silks and manufactured fabrics the rates have averaged ⅓ of one cent per ton per mile, or ⅓ of a penny.

"The gross freight tonnage of 1876 is but 8 ⅓ per cent. less than the largest freight tonnage ever transported over the lines within any previous twelvemonth, and does not materially vary in amount from the tonnage of 1875.

"As has been remarked in the previous report, the inclination has been to keep from increasing the through freight tonnage at such ruinous rates of carriage, the result of which rates was the more serious as, unlike some of the roads in competition, the location of this line and its business precludes the reloading returning west-bound cars to any considerable extent.

"For even at the rates of the last two years, while at the same time lacking the economy in operating expense incident to the possession of a track of steel rails, the cost of this freight service would be very considerably reduced if, in the main, cars could be loaded in going and returning between termini.

"It will be observed in the tables that the average cost per ton per mile of freight traffic in the calendar year of 1876 was ⅓ of one cent. The through freight reaches in 1876 the amount of 174,269,362 tons hauled one mile, which, at the average cost of ⅓ cent, equals \$1,348,944.86. As the actual revenue derived from the through freight was but \$1,101,600.60, it is shown that the apparent loss in handling this particular traffic was \$247,344.26. The comment made in the previous annual report upon a similar extraordinary result is again referred to.

"The tables show fully the peculiar effects of the trunk lines' rivalry and America's Centennial Exposition upon the road's passenger traffic. The local travel falls off heavily as compared with the previous year; the through travel shows an increase in numbers, but scarcely equaling more than one-half the deficiency of the local passengers, while the average rate per mile received from both local and through drops to the lowest point known; the first-class rate upon through passengers for the year being 1.55 cents, or less than ¼ of a penny per mile.

"It will be seen that there is an increase in the tonnage of and revenue from iron ore, and in oil there is a decrease in the number of barrels transported and in revenue. The bituminous coal tonnage shows an increase, with a decrease in revenue; and the anthracite tonnage and revenue have both fallen off.

"The opinion expressed in the previous report, that no ordinary railroad traffic could be burdened in times of depressed rates, and in periods of business adversity, with the cost of leased equipment, under a fixed contract, if proper economy is to be regarded, is again repeated. It is especially desirable,

under the demoralized freight rates of the past three years, to be free from the certain operating loss entailed by a deficient equipment."

Mr. Devereux here states the terms of the old contract with the United States Rolling Stock Company as requiring a rental equivalent to 15 per cent. on the valuation of the equipment rented, the lessee maintaining it to standard and paying all taxes. To show how burdensome such a contract was, he states that if at the beginning of the receivership \$1,000,000 of 8 per cent. equipment bonds could have been issued at 90, the \$900,000 so realized would have provided equipment sufficient to accommodate the traffic which has actually been carried by the leased cars of the United States Rolling Stock Company. Thus the annual payment of \$80,000 would have secured what the Rolling Stock Company was to be paid \$270,000 for. The modified contract with this company requires 10 per cent. on cost as the rental of the standard-gauge stock and one cent per mile run for the broad-gauge cars.

"In the previous annual report reference was made to the then recently erected steam-boats for the changing of car-bodies, loaded or empty, to and from broad and narrow-gauge trucks, at the stations of Leavittsburgh, Mansfield and Dayton; and, in connection with the boats, was noted the establishment of a new through freight and passenger line between New York and Chicago, in connection with the Erie and the Baltimore & Ohio railroads.

"At Mansfield also, in the furtherance of this alliance, extensive stock-yards for the accommodation of a proposed through live-stock traffic were completed.

"The good effects of the Leavittsburgh hoist in accommodating the local freight traffic of the road, for reasons stated in the previous report, have been more and more apparent.

"But the results of the new through freight and passenger lines have been to the Receiver simply failure and loss.

"These two lines could have been worked successfully, and the passenger line did run nearly through the year, with uniform regularity as to schedule time, and with apparent excellent satisfaction to such portion of the public as it was permitted to reach.

"The passenger line received the countenance and aid of the Erie interest; but the east-bound passenger traffic was from the first neglected, and certainly it was not worked for by the Baltimore & Ohio Railroad, whose efforts were unchanged in continuing to send passengers from all western points via their own main-stem, through Baltimore, to the East and New York. Repeated attempts at harmony and co-operation produced delay, but failed to improve the business of the line, which was doubtless further deplorably affected by the trunk line's struggle over the respective commercial advantages of the cities of Baltimore, Philadelphia and New York. The line, complete in appointment and thoroughly attractive, was a success in everything except remunerative earnings. It was formally abandoned at the time of adopting the winter passenger train schedule.

"The freight line results were even more extraordinary. It is to be noted that the formation of both freight and passenger lines was first at the instance and invitation of the Baltimore & Ohio executive, immediately followed by the co-operation and backing of the Erie. The mutual understanding of the purpose, responsibilities and agreements of all parties in forming said new lines are not now, and have not been at any time, matters of inference or uncertainty; as, although the contract was not actually signed, its terms had been thoroughly canvassed and were written out, and under its provisions proceedings were begun and continued. The differences between the Erie and the Baltimore & Ohio, preventing dual consummation of the contract, seemed to be in some respects trivial; but one thing continued from the opening of the new freight line to the last—failure to work the line, which had been fully prepared by equipment and a special organization for a considerable movement of tonnage.

"For the first quarter of 1876, as before remarked, rates were at a fair figure and firmly held, and so held chiefly because of a good understanding between the trunk lines, and of a pool at Chicago by the Eastern roads terminating there. The Atlantic's new freight line got nothing from Chicago, and but little to Chicago, during this period.

"The Baltimore & Ohio was in this pool, but was carrying all its traffic past Mansfield to Baltimore; and contented therewith, it failed, either through unwillingness or inability, to put the new freight line into its proper position, which was to transport eastward from Chicago the agreed division of New York traffic assigned to the Baltimore & Ohio by the pool; or, in lieu of the carriage of such freight, to insist, as also consistent with the terms of the pool, that the Atlantic should receive proportionately with the Baltimore & Ohio road from the pooled lines' money, the agreed division of net earnings upon the New York tonnage allotted to the Baltimore & Ohio road, but which while maintaining rates, the new line had failed to transport.

"The Atlantic received no consideration whatsoever, as results have proved. The gain of the New York traffic was thus with the Baltimore & Ohio road without actually transporting it during the period referred to.

"The opening of the trunk lines' warfare reduced suddenly all through rates, and again the new freight line was rendered, and continued, inoperative from a common conclusion that the traffic was unprofitable. The new freight line was formally abandoned late in the year.

"The outcome of the live stock traffic in connection with the new through freight line was more remarkable than all else.

"The Atlantic put into the Mansfield stock yards and tracks in cash \$40,032.65, the Baltimore & Ohio furnishing a like sum, and for its proportion of the cost of the hoists at Mansfield and Leavittsburgh the Atlantic paid \$15,748.00, the Baltimore & Ohio and the Erie respectively paying a like amount for their one-third interest in the same. The result of the business of the stock yards proper has been a current income sufficient to meet the necessary expenses of the yards, and nothing more. No particular profit was expected from the management of the yards, which were to aid, as a necessity, and serve as an attraction in the building up of a new live stock route between the West and East. But during the year almost all of the live stock brought from Chicago for New York by the Baltimore & Ohio road, has passed through these yards, and has been delivered, not to the Atlantic, but to the Pennsylvania line, which through a leased road intersects the Baltimore & Ohio Railroad at Mansfield. This manner of procedure was changed a short time ago, when the live stock for New York, or most of it, via the Baltimore & Ohio, was diverted to the Lake Shore Railway at Sandusky, and which will probably consummate the Atlantic's loss by causing the Mansfield stock yards to be closed for lack of sufficient business.

"It is now only remarked that no final settlement of these joint matters has been had.

"As some offset to these embarrassments and consequent loss of outlay and revenue is to be noted, the appreciated action of the Receiver of the Erie Railway in readjusting the percentage divisions of the freight rates between that road and the Atlantic, to the benefit of the latter, upon a more liberal basis than has heretofore existed, and one which is entirely satisfactory. And, further, has been received the co-operation of the Erie road in extending and strengthening the general traffic, via Urbana, and also via Dayton.

"The through Chicago freight business is now done altogether over the Urbana route with the Pittsburgh, St. Louis & Chicago Railroad, aided by a steam hoist, which has recently been erected at Urbana. The hoist was supplied by private parties, who contract to transfer the car bodies at an agreed

price per car, and at any time the roads can exercise the option of purchasing the hoist at its actual value.

The passenger line abandoned via the Baltimore & Ohio was transferred at the request of the Erie road, and with the co-operation of the Pennsylvania line (Pittsburgh, Fort Wayne & Chicago Railway), has been run without interruption, via Mansfield.

Traffic relations with the Cincinnati, Hamilton and Dayton Railroad are again somewhat uncertain. The contract continuing a business connection and interchange with that road, which took effect March 1, 1876, is now abrogated under formal notice from that company, and the matter is one of rearrangement. The present difference is as to the proper charge for train and car service between Dayton and Cincinnati, and grows out of the disappointment of the Cincinnati, Hamilton & Dayton managers at the current rates of the joint through traffic.

In conclusion, it is stated that the railroad and its equipment have been well maintained throughout. Economy has never been understood to mean the withholding of any expenditure and labor necessary to ensure the integrity of structures, the safe condition of track and a proper excellence of locomotive power and of cars.

And, in respect of the equipment, not only have full charges been made in its maintenance and renewal, but the cost of changing all cars for hoist service (now over one thousand so changed), has gone into repairs account.

Finally, the results of the receivership can be comprehensively stated as follows: The property has been kept intact; and through the two darkest years thus far of American railroad operations it has been improved and strengthened in its relations to all traffic and other interests; and, while maintaining the tonnage of the line, has been kept in absolutely good condition, certainly without deterioration in any of its parts.

After paying all operating expenses, taxes, and all rentals and general expenses, and after further paying \$228,205.93 on account of additions and construction, a richly chargeable to capital account, but which of present necessity must be provided from the Receiver's revenue, there is then shown to be a deficit of \$5,669.25.

The amount of the obligations of the Atlantic & Great Western Railroad Company paid by the Receiver under the orders of the courts is \$1,264,783.73, of which amount the Receiver has been obliged to furnish in cash from his own revenue the sum of \$966,413.97.

The present total amount of outstanding debt funded in Receiver's warrants is \$378,563.87, of which sum the particular warrants issued to the United States Rolling Stock Company amount to \$280,899.79. It is seen therefore, that in round figures there is a floating debt of about six hundred thousand dollars, which severely hampers and restricts the administration of the affairs of the railroad.

OLD AND NEW ROADS.

Pennsylvania.

The annual meeting in Philadelphia, March 13, was largely attended, but no business of importance was transacted. A resolution was offered instructing the board to prohibit the issue of free passes to anyone except an employee of the company, but it did not pass. Another resolution was offered directing the board to use any surplus remaining after paying 8 per cent. dividends to buy up the stock or bonds of the company, to be held as a reserve, but, after some discussion, it was withdrawn.

It is said that surveys are being made for a branch from the Bedford Division westward to Meyersdale in Somerset County, Pa. The distance is about 18 miles and the branch would be parallel to the Pittsburgh Division of the Baltimore & Ohio.

Delaware, Lackawanna & Western.

Notice was given on March 9 that the pay of all the foremen in the repair shops and mines of the company would be reduced \$10 per month, and that of all the station agents \$5 per month. There is also to be a general reduction in miners' wages, but the company will make some compensation by reducing the rents of its tenements and the price of powder for blasting.

The arching of the new tunnel through Bergen Hill, N. J., is now substantially done, and the work of finishing up the track through the tunnel is in progress. The approaches are in condition to be used, and it is thought that trains will run through next month.

Ohio & Mississippi.

Five men, who are believed to have been concerned in a number of recent robberies from the cars of this company, were arrested at Flora, Ill., recently, immediately after they had broken into and robbed some cars standing at that station. It is said that there is abundant evidence to convict the gang, who have caused much annoyance to the officers of the road. Other members of the gang have since been arrested.

Meetings.

The following companies will hold meetings at the times and places given:

Pittsburgh, Cincinnati & St. Louis, annual meeting, at the office in Columbus, O., March 20, at 10 a. m.

Allegheny Valley, annual meeting, at the office in Pittsburgh, Pa., April 10, at 11 a. m.

St. Louis, Iron Mountain & Southern.

The controversy as to the voting of the 25,000 shares held in trust by Baring Brothers is still before the courts and the various injunctions obtained are still in force; consequently no election of directors has been held.

On March 10, Mr. George Tyson, of New York, for himself and other creditors, applied to the United States Circuit Court for an injunction to restrain Messrs. Allen and Marquand from voting on the disputed stock. The Court refused to grant the injunction on the ground that no unusual leniency was shown and that the matter was already before a State court.

Eldorado & Walnut Valley.

Work has been begun on this road, which is to extend from the Atchison, Topeka & Santa Fe at Florence, Kan., to Eldorado, about 30 miles.

Indiana North & South.

It is said that surveys are in progress for an extension of 15 miles from Attica, Ind., north to Templeton, the junction of the Cincinnati, Lafayette & Chicago and the Lafayette, Muncie & Bloomington roads.

General Passenger and Ticket Agents' Association.

The usual semi-annual meeting began at the Southern Hotel, St. Louis, March 9. The address was delivered by Mr. Kimball, of the Union Pacific, and related chiefly to State regulation of railroads and the demand for cheaper transportation. After electing officers for the ensuing year, Mr. James Charlton, of the Chicago & Alton, was chosen to deliver the address at the Fall meeting. Most of the time of the Association was taken up by the usual routine work of preparing the Summer schedules, etc., which was not quite finished.

Southern Pacific.

The terminal station, to which regular trains run, on the Yuma Division, is now at Dos Palmas, 631.4 miles from San Francisco, and 160.8 miles east by south from Los Angeles. Track is laid to Castle Rock, 19 miles further. Dos Palmas is

the lowest point reached in crossing the desert, being 278 feet below the sea level.

An artesian well sunk at a point about 15 miles east of Indian Wells, on the Colorado Desert, has struck an apparently abundant supply of good water at a depth of 300 feet. This is a very important discovery, as the want of water in crossing the desert was expected to be a source of great expense in operating the road.

Chicago, Saginaw & Canada.

Gen. Daniel E. Sickles and others, holders of \$250,000 bonds of this company, have brought suit to prevent the officers of this company from disposing of a large number of bonds executed but not sold. A foreclosure suit has been begun and it is charged that the defendants in the present suit intend to issue a number of the bonds and to secure control of the property.

Central, of New Jersey.

The immediate cause of the demand of the Lehigh Coal & Navigation Company for full payment of arrears of rent due the Lehigh & Susquehanna road, was the failure of the Central to pay a note for \$250,000, a part of the rental, which became due March 7. The ten days of notice have not yet expired, but it is understood that Receiver Lathrop will refuse to surrender the road, and further legal proceedings will follow.

Western Union Telegraph.

At the directors' meeting in New York, March 14, the following statement was presented:

Surplus Jan. 1.....	\$249,395 09
Net earnings (estimated) quarter ending March 31.....	787,613 43
Total.....	\$1,037,008 52
Interest, sinking funds, etc.....	142,500 00
Surplus.....	\$894,508 52

On this showing it was resolved to declare the usual quarterly dividend of 1½ per cent., which will absorb \$507,175 of the above surplus.

Chicago & Lake Huron.

Some of the holders of the Port Huron & Lake Michigan bonds claim that their bonds, under the terms of the mortgage, will cover the new road from Flint to Lansing, although it was built by a distinct company, and there is some talk of taking steps to enforce this claim.

Houston & Texas Central.

In the United States Circuit Court at Austin, Tex., March 9, leave was given to counsel for Moses Taylor, John I. Blair and other non-resident creditors to file a bill for the appointment of a receiver.

On March 10 the case was adjourned over for two days by request of one of the directors, who desired to appear in opposition to the application. Leave was also given to the Union Trust Company to join in the suit as Trustee in possession of the Missouri, Kansas & Texas road, which has claims against the company. The Dickinson Manufacturing Company, of Scranton, Pa., subsequently obtained leave to appear in the suit as a creditor.

The Texas directors of the company are reported as being very much opposed to a receivership and as preparing to contest the application. At latest accounts no action had been taken by the Court.

The stock of the company is comparative small in amount and is principally held by a few parties. The bonded debt amounted by the last report to \$12,336,000; the net earnings reported for 1876 were sufficient to pay the interest on this and leave a surplus of \$370,000. The company is reported to be carrying a large floating debt, and its earnings so far this year show a considerable decrease. Very little, however, is known definitely about the company's affairs, as its reports have been limited almost entirely to brief statements of earnings and expenses.

There are reports, not authenticated, however, that the company has made arrangements with Mr. Charles Morgan, who is to advance the money to pay off the floating debt and to receive a controlling interest in the road in return.

Missouri Railroad Commission.

On March 12 the bill to repeal the law of 1875, under which the Railroad Commission was established, was defeated in the Missouri State Senate.

New York & New England.

The Massachusetts Legislature has adopted an order directing the Railroad Commission to make a thorough investigation of the affairs of this company. The State is a large stockholder and has also made advances of about \$750,000 to the company.

Dividends.

Dividends have been declared by the following companies:

New York Central & Hudson River, 2 per cent., quarterly, payable April 16.

New York & Harlem, extra dividend of 2 per cent. from profits of city line, payable April 2.

Western Union Telegraph, 1¼ per cent., quarterly, payable April 14.

Keokuk & Northwestern.

A contract has been concluded with the Keokuk & Minnesota Construction Company by which that company transfers to the new Keokuk & Northwestern Railroad all the graded roadbed and work done on the old Keokuk, Ia., and Iowa City, together with the right of way, uncollected subscriptions and other property. The contract requires that work shall be begun at once on the road and substantial progress made within six months.

Wheeling & Lake Erie.

This company has closed a new contract with H. B. Willson, of New York, who agrees to complete and equip the road, and build shops and depots, for \$20,000 per mile, payable \$3,000 in cash, \$7,000 in stock, and \$10,000 in bonds. He agrees to begin tracklaying at Norwalk, O., by April 15, and to have 95 miles from Huron south in operation by Dec. 1.

Wabash.

The application of Edward Harding and others for a receiver has been postponed by the United States Circuit Court until March 23, when argument will be held. It appears that the applicants are holders of bonds issued prior to the consolidated mortgage, who now refuse to accept the funding proposition made by the new company. It does not appear, however, whether they represent any large amount of bonds.

Great Western, of Canada.

From March 3 until further notice the suspension bridge over the Niagara River is closed to passenger traffic in order that general repairs may be made. Through passenger trains over the Great Western will be run by way of Buffalo and the International Bridge and thence over the loop line to Glencoe. The usual time and connections will be made.

General Manager Broughton has issued the following circular:

"Referring to the advertisement of this company announcing the diversion of a portion of the traffic from the Suspension Bridge, I desire to say that that bridge is again undergoing a thorough examination.

"The whole of the superstructure has already been inspected and found to be in a very satisfactory state of preservation, and the portions of the cables imbedded in masonry as well as the

foundations are now being subject to rigid scrutiny, during which, and to expedite the necessary repairs, it has been determined to divert temporarily the passenger trains by way of the International Bridge and Buffalo as advertised.

"Due notice will be given of the resumption of the traffic by Niagara Falls (Clifton)."

A careful examination of the exposed part of the supporting cables of the bridge has showed them to be in good condition. The examination of that part of the cables covered by the masonry of the anchorages has shown as yet only a very few strands of wire corroded, so few as not to affect in any way the strength of the bridge. It is intended to make the examination very thorough. Freight trains continue to cross the bridge.

Indianapolis, Cincinnati & Lafayette.

The United States Circuit Court has authorized Receiver Ingalls to pay all debts for labor and supplies incurred within six months prior to Aug. 1, the date of his appointment; also to issue certificates of indebtedness for a claim of the Cleveland Rolling Mill Company for supplies furnished.

Scioto Valley.

Suits have been begun against all the subscribers to the stock who have not paid up, the amount involved being about \$140,000.

Arrangements are being made to begin work on the extension of the road from Chillicothe to Portsmouth. The present plan is to use the Marietta & Cincinnati track from Chillicothe to Schooley's, 7 miles, leaving 36 miles to be built from Schooley's to Portsmouth.

Atchison, Topeka & Santa Fe.

This company's report for January is as follows on 711 miles worked:

Freight.....	\$14,780 74
Passengers.....	42,985 09
Miscellaneous, mail and express.....	7,097 20

Total earnings (\$190 per mile).....\$134,863 03

Expenses (68.90 per cent.).....92,916 67

Net earnings (\$59 per mile).....\$41,946 36

As compared with January, 1876, when 629 miles were worked, there is an increase of 14.9 per cent. in gross earnings and a decrease of 8.4 per cent. in net earnings.

Macon & Brunswick.

The Hazlehurst bid for this road has not been accepted, and the road will remain in the hands of the State of Georgia for another year. The Governor is to call for new proposals for the sale or lease of the road in time to submit them to the Legislature next year.

Illinois Central.

The Land Department reports for February sales of 805.06 acres of land for \$6,149.30. The cash collected on land contracts was \$12,041.16.

The Traffic Department reports earnings in Illinois: 1877, \$365,067.23; 1876, \$451,760.53; decrease, \$86,693.30, or 19.2 per cent.

The Chicago report gives the earnings in Iowa for February: 1877, \$95,772.45; 1876, \$125,941.59; decrease, \$30,169.14, or 24 per cent.

Little River Valley & Arkansas.

This road is now graded from New Madrid, Mo., westward to Malden in Dunklin County, 27 miles, and all of the bridging is done. The road passes through a heavily timbered country.

Hannibal & St. Joseph.

Work has been begun on a grain elevator of 200,000 bushels capacity at St. Joseph, Mo., and others are to be built at Hannibal and Kansas City.

Nashville, Chattanooga & St. Louis.

The extension of the Jasper Branch from Jasper, Tenn., up the Sequatchie Valley is nearly all graded, and tracklaying has been begun. The extension is to be 7½ miles long, and is to serve a coal and iron district.

Lake Superior & Mississippi.

In the United States Circuit Court at Davenport, Ia., March 8, after hearing argument, Judge Dillon granted the final decree of foreclosure of the first mortgage, with an order for the sale of this road. With regard to the track owned in common with the Northern Pacific, from Thompson Junction to Duluth, it was ordered that the original contract between the two companies be maintained.

Wilmington & Northern.

The Delaware Legislature having granted a charter to this company, formed by the bondholders who bought the Wilmington & Reading road, a new organization under the Delaware law was to be made this week.

Gulf, Colorado & Santa Fe.

This company asks for proposals for the construction of its road from the present terminus at Arcola, Tex., to Belton and possibly to Comanche. The road to be built is about 200 miles, and a considerable part of the pay is to be in securities of the company. It has a land-grant of 16 sections to the mile.

The people of Belton are desirous of having the company build the 40 miles from that town to the crossing of the International and Great Northern before the rest of the road, and negotiations to that end are now in progress.

Bedford, Brownstown & Madison.

A correspondent informs us that the work of finally locating the line between Madison, Ind., and Hanover has been begun.

Galveston, Harrisburg & San Antonio.

This road is to be extended a short distance beyond San Antonio, Tex., to the Alazan Creek, where extensive stock yards will be built. The object of the extension is to place the stock depot outside of the city for greater convenience of shippers.

Fitchburg.

About 200 men are now at work on the second track between Fitchburg, Mass., and Ashburnham on the Vermont & Massachusetts Division. The deep cut at Wachusett is nearly finished, three new bridges have been built at Westminster and work has been begun on a stone arch bridge at Fitchburg.

Missouri, Kansas & Texas.

During 1876 this road carried 210,824 passengers against 175,685 in 1875, an increase of 35,139, or 20 per cent. There were also carried 76,824 pieces of baggage without the loss of a single piece.

Rumors have been current in St. Louis of a disagreement with the Missouri Pacific as to the terms on which St. Louis business from this road passes over the Pacific road from Sedalia to St. Louis. The old contract between the companies expires this month.

Boston & Philadelphia Through Line.

In the suit brought by the City of New York to enjoin the running of the transfer steamboat Maryland from Mott Haven to Jersey City in connection with this line, the United States Circuit Court has decided that the running of the boat did not constitute a ferry within the meaning of the city charter. The boat was a part of the through railroad line and adapted and used solely for the transportation of trains, and was an instrument of inter-State commerce with which the city had no right to interfere. Consequently the city could not enjoin the run-

ning of the boat or compel its owners to take a ferry license. The city's claim was that, under its charter no persons had a right to run a ferry to or from any point within its limits without a license or lease.

Southeastern, of Canada.

Mr. Bolckow, the well-known English iron-master, has brought suit in the Superior Court at Montreal to recover \$1,000,000 on bonds and unpaid coupons of this company. He asks for a judgment of foreclosure and a sale of the road to satisfy his claim.

Connection Railroad Commission.

The bill to abolish the present commission and to provide for a new one in its place failed to pass the State Senate. The reasons urged for its passage were mainly connected with State politics and did not involve any condemnation of the present commission. The bill is now dead for this year.

Honore Tunnel Line.

The Railroad Committee of the Massachusetts Legislature is through with its hearing on Mr. Crane's old Boston & Chicago Trust Company project, which has been before the Legislature for several years and apparently stands very little chance now. The committee is now hearing arguments on Mr. Burt's plan for a consolidated line from Boston to the Hudson River, with a new connection to the Pennsylvania coal fields.

Des Moines River.

A company by this name has been organized to build a railroad from Emmitsburg, Md., about 25 miles west of the present terminus of the Iowa & Dakota Division of the Chicago, Milwaukee & St. Paul, northward to the Sioux City & St. Paul road near Butterfield, Minn. The distance is about 60 miles and the capital stock is fixed at \$100,000.

Atlantic, Mississippi & Ohio.

The Receivers give notice that they will pay at the office of Perkins, Livingston, Post & Co., No. 23 Nassau street, New York, on and after March 15, the coupons which became due Jan. 1 on South Side, Norfolk & Petersburg and Virginia & Tennessee bonds and Virginia & Tennessee interest-funding bonds, also the January coupons on the interest-funding notes of the consolidated company.

Cleveland, Columbus, Cincinnati & Indianapolis.

The trustees under the consolidated mortgage give notice that 26 bonds have been drawn for redemption by the sinking fund, in accordance with the terms of the mortgage, and will be paid June 1 by Drexel, Morgan & Co., New York, or J. S. Morgan & Co., London. Interest will cease from that date. The numbers drawn are: 3854, 4031, 4053, 4079, 4130, 4143, 4231, 4393, 4459, 4511, 4540, 4710, 4724, 4930, 5138, 5213, 5434, 5543, 5563, 5810, 5964, 5998, 6008, 6038, 6067, 6156.

Lafayette, Muncie & Bloomington.

The motion to appoint a receiver for this road has been dropped and proceedings discontinued.

North Carolina Railroad Taxation.

The general tax law passed by the North Carolina Legislature contains the following provision: "Every railroad or canal company, not liable to a tax upon its property or the shares therein, shall pay a tax on said corporation a sum equal to 1 per cent. upon gross earnings on the first days of July and January; those railroads which are liable to a tax on franchise and personal property shall pay as a corporation tax a sum equal to one-half of 1 per cent. on such receipts. The tax for July, 1877, shall be only on the receipts from April 1, 1877, to July 1, 1877."

Atlantic & North Carolina.

The old board still refusing to surrender the road, the new State directors made application to the North Carolina Circuit Court at Greensboro for the appointment of a receiver pending a decision as to the lawfulness of the new board. The Court granted the application and appointed Maj. John Hughes Receiver.

The old directors do not deny the right of the Governor to appoint new State directors, but claim that their term of office does not begin until June next, when the annual meeting takes place, and they refuse to vacate until that time.

Joplin.

This road is now graded the whole distance from Girard, Kan., to Joplin, Mo., 38 miles. The work of tracklaying is in progress on the 18 miles still unfinished and will, it is expected, be completed early in the summer.

Martha's Vineyard.

Nearly all of the stockholders have signed an agreement to surrender the road to the floating debt creditors, who are to hold and work it until their claims are paid off, when possession will revert to the stockholders. The floating debt is about \$30,000; the net earnings last year were \$1,206. The road is 10 miles long, of 3 ft. gauge, on the Massachusetts island of Martha's Vineyard and is used for summer pleasure travel.

Mobile & Ohio.

On behalf of the company a cross suit has been begun in New York asking that Mr. Morris Ketchum be removed from the position of trustee under the first mortgage, or that he be declared to have resigned on the ground that he made no attempt to act as trustee for 15 years, not even protesting against his alleged removal, and making no attempt to interfere with his successors until he began his suit last year.

Empire Mine.

Work has been begun on a railroad from Antioch, Cal., to the Empire coal mine, five miles distant. From Antioch shipments can be made to San Francisco by water, and at the same place a connection can be made with the Central Pacific's new loop line.

Union Railroad Transfer & Stock Yards.

The Indiana Legislature has passed the bill legalizing a subscription by the city of Indianapolis in aid of this company, which proposes to build a line around the city to connect the various roads entering it. The question of completing the subscription now rests with the City Council.

The City Council has completed the subscription and ordered the execution and issue of \$500,000 Indianapolis city bonds to the company.

Montclair & Greenwood Lake.

The wooden spans of the bridge over the Passaic River at Woodside, N. J., are to be replaced with iron, the contract having been let to the Kellogg Bridge Company, of Buffalo. The draw-span was burned some time ago, and was then replaced with an iron draw. The rest of the bridge is not in very good condition, and must have been renewed soon in some way.

Somerset.

A public meeting was held in West Waterville, Me., March 1, to consider the question of an extension of this road and the securing of better connections. Most of the speakers advocated the construction of the Messalonskee & Kennebec road, whose charter covers the line from West Waterville to Augusta, and there was some talk of a change to 3 ft. gauge. A committee was appointed to confer with parties interested.

Cayuga.

Negotiations are said to be in progress for a lease of this road to the Delaware, Lackawanna & Western. The latter

company has a line from Owego on the Erie north by west to Ithaca, 33 miles, connecting with the Cayuga road at Ithaca. The Cayuga road runs from the last-named place north by west to Cayuga Bridge on the New York Central, 38 miles. If the Delaware, Lackawanna & Western makes the lease it will, it is said, change its Ithaca & Owego line (which is still of 6 ft. gauge) to 4 ft. 8 1/2 in. gauge, and will complete the connection with its main line by laying a third rail on the Erie from Owego to Binghamton, 22 miles.

ANNUAL REPORTS.

Illinois Central.

We have already (on page 67, current volume) published the directors' report; the full report and statements for the year ending Dec. 31, 1876, are now published. The road owned consists of a line from Cairo, Ill., to Dubuque, Ia., with a branch from Centralia to Cairo, 705.5 miles in all, with 138.72 miles of sidings; the line leased consists of a line across Iowa from Dubuque to Sioux City, 326.6 miles, with a branch from Cedar Falls to Janesville, 75.6 miles, 402.2 miles in all, of which 142.9 miles are owned by the Dubuque & Sioux City, 183.7 by the Iowa Falls & Sioux City, and 75.6 miles by the Cedar Falls & Minnesota Company.

The equipment consists of 202 engines; 78 passenger, 8 smoking, 51 baggage, mail and express, 18 sleeping and 8 old passenger cars; 50 Blue Line, 3,143 box and combination, 352 stock, 1,411 coal and flat and 4 powder cars; 2 officers, 1 pay and 25 service cars. There was during the year an increase of 293 box and combination, 2 stock and 2 flat cars; 150 box cars are leased to the New Orleans, St. Louis & Chicago road.

The general balance sheet at the close of the year was as follows:

Permanent expenditures in Illinois.....	\$36,816,675 40
" " " Iowa.....	778,560 53
Working stock of supplies.....	535,251 70
Cash assets.....	825,120 95
Miscellaneous assets.....	511,000 00
Bonds of New Orleans line.....	4,842,000 00
Total assets.....	\$44,308,608 58
Shares.....	29,000,000 00
Six per cent. currency redemption bonds of 1890.....	2,500,000 00
Six per cent. sterling bonds of 1895.....	2,500,000 00
Five per cent. sterling bonds of 1905.....	1,000,000 00
Sinking fund five.....	4,898,000 00
Construction bonds still outstanding (7 per cent.).....	64,000 00
Surplus.....	10,662,000 00
	4,646,608 58

Total Liabilities..... \$44,308,608 58
The bonded debt has been increased by \$897,000 sterling 5 per cent. bonds. To meet the remaining \$64,000 of 7 per cent. bonds there are land contracts and notes amounting to \$600,000. \$28.75 in all. The permanent expenditures account was increased by \$801,919.58, whereof \$203,073.07 was for new equipment and \$598,846.51 for construction, the principal item being \$233,558.99 for steel rails.

The Land Department reports sales of 11,269.65 acres for \$79,380.10, and town lots for \$890; cash collections on land contracts were \$170,439.50. The entire land grant was 2,595,000 acres; 2,302,069.16 acres have been sold, leaving 292,930.84 acres unsold, whereof the great bulk (209,877.46 acres) lies south of the Ohio & Mississippi road and only 3,500 acres north of Decatur on the Main Line and Tolono on the Chicago Branch.

The work done was as follows:

	1876.	1875.	Inc. or Dec.	P. c.
Train mileage, passenger.....	1,511,174	1,478,191	Inc.	32,983 2.2
Train mileage, freight.....	2,731,926	3,179,753	Dec.	447,827 14.1
Train mileage, service and switching.....	925,022	961,497	Dec.	36,475 3.8
Total.....	5,168,022	5,619,441	Dec.	451,419 8.0
Passengers carried.....	1,815,788	1,648,541	Inc.	167,247 10.1
Passenger mileage.....	61,238,031	50,828,505	Inc.	10,409,526 0.8
Tons freight carried.....	1,899,627	2,016,424	Inc.	116,797 5.8
Tonnage mileage, north-bound.....	143,583,655	124,342,773	Inc.	19,240,882 15.5
Tonnage mileage, south-bound.....	121,018,059	100,308,138	Dec.	39,269,479 24.5
Total.....	264,601,714	224,650,911	Dec.	20,048,997 7.0

Of the tonnage mileage 85.6 per cent. in 1876, and 82 per cent. in 1875 was of local business. The change in the relative amount of north and south-bound traffic is very noticeable. Some general averages are as follows:

	1876.	1875.	Inc. or Dec.	P. c.
Average passenger train load, No.....	33.91	34.39	Dec.	0.48 1.4
Average freight train load, tons.....	96.86	89.52	Inc.	7.34 8.2
Earnings per mile, passenger trains.....	\$1.2872	\$1.3632	Dec.	\$0.0760 5.6
Earnings per mile, freight trains.....	1.7389	1.7269	Inc.	0.0113 0.7
Earnings per mile, all trains.....	1.372	1.395	Dec.	0.023 1.6
Expenses per train mile.....	0.744	0.709	Inc.	0.035 4.9
Net earn. per train mile.....	0.628	0.686	Dec.	0.058 8.5
Average receipt per passenger per mile.....	3.17 cts.	3.28 cts.	Dec.	0.11 ct. 3.4
Average receipt per ton mile.....	1.79 "	1.93 "	Dec.	0.14 " 7.3
Av. freight train, cars.....	111.17	11.66	Dec.	0.48 4.1
Cost of engine service per mile.....	18.81 cts.	19.87 cts.	Dec.	0.76 ct. 3.9

The earnings of the entire road were as follows:

	1876.	1875.	Inc. or Dec.	P. c.
Freight.....	\$4,748,355 10	\$5,409,995 30	Dec.	\$742,640 29 13.5
Passenger.....	1,624,711 62	1,668,492 69	Dec.	43,781 07 2.6
Mail.....	162,197 66	181,852 10	Dec.	19,754 44 10.9
Express.....	117,784 30	127,815 25	Dec.	10,078 95 7.9
Sleeping cars.....	36,591 07	34,328 36	Inc.	2,262 71 3.7
Rents of prop'ty.....	94,231 73	94,467 62	Dec.	235 89 0.3
Rents of tracks.....	151,613 45	158,128 11	Dec.	6,514 66 4.1
St'rage and dockage.....	13,716 48	12,346 13	Inc.	1,370 35 11.1
Switching.....	34,140 19	26,112 32	Inc.	8,027 87 30.8
Telegraphing.....	1,886 52	1,886 52	Inc.	0 0.0
Tr'n n'w ag'ncy.....	4,977 49	2,483 25	Inc.	2,494 24 100.6
Cairo wharf-b't.....	3,887 42	5,096 17	Dec.	1,208 75 23.7
Inter-State trans.....	13,832 64	39,866 39	Dec.	25,733 75 65.0
Mileage of cars and engines.....	83,813 92	83,813 92	Inc.	0 0.0
Total earn.....	\$7,090,699 49	\$7,841,781 78	Dec.	\$751,092 29 9.6
Work. expenses.....	3,845,642 75	3,989,447 05	Dec.	143,804 30 3.6
Net earnings.....	\$3,245,056 74	\$3,852,334 73	Dec.	\$607,278 99 18.8
Gross earn. per mile.....	6.401 27	7.079 34	Dec.	678 07 9.6
Exp'n's per mile.....	2,471 74	3,601 56	Dec.	1,129 82 3.6
Net earnings per mile.....	2,929 53	3,477 78	Dec.	548 25 15.8
Per cent. of expenses.....	54.23	50.87	Inc.	3.36 6.6

There was a decrease in almost every item of expenses except maintenance of way, which showed an increase of \$93,773.85, or 9.4 per cent., which was chiefly due to the necessity of repairing damage done by flood.

The earnings of 1876 were divided as follows:

Earnings from lines owned.....	\$4,872,129 97
Net earnings over Chicago, Burlington & Quincy.....	385,311 86
" " Toledo, Peoria & Warsaw.....	49,230 39
Cairo wharf-boat and transfer.....	17,720 06
Earnings over other lines.....	96,809 50
Total in Illinois (\$7.685 per mile).....	\$5,421,091 78
Dubuque & Sioux City (\$8.556 per mile).....	979,871 78
Iowa Falls & Sioux City (\$2.731 per mile).....	801,755 94
Cedar Falls & Minnesota (\$1.823 per mile).....	137,349 20

Total of all lines..... \$7,040,969 10

The difference between this amount and that given in the Superintendent's report is made by the allowance of \$49,720.39 for expenses of business done over the Toledo, Peoria & Warsaw road. The income account is as follows:

Net earnings (deducting \$49,720.39, as above).....	\$3,195,326 35
Charter tax paid State of Illinois.....	\$356,005 58
" " " Iowa.....	68,556 90
Rental of leased lines.....	625,987 56
	1,060,550 04

Surplus..... \$2,144,776 31

Balance from previous year..... 109,023 56

Land office receipts..... 143,837 69

Premium on 5 per cent. loan of 1905..... 24,982 33

Total..... \$2,422,619 79

Interest on funded debt and premium..... \$616,792 01

February and August dividends (4 per cent. each)..... 2,320,000 00

Balance at debit of income..... \$614,172 22

The Chief Engineer reports 3.08 miles new sidings laid; several new stations and other buildings erected; the new office building in Chicago fitted up; four new truss bridges built; 40.62 miles new fence built; 40.42 miles of track ballasted; 10,438 feet pile bridging rebuilt; extensive repairs made of damages caused by flood, and many minor improvements. There were used in renewals 12,483.42 tons steel and 5,004.2 tons iron rails; at the close of the year 352.3 miles of track were laid with steel, of which 17.36 miles were in Iowa.

General Manager Clarke's report refers to the loss of traffic from the failure of the wheat crop in Iowa, and to the extremely low rates on through business caused by the competition of the east and west lines crossing the road at various points. He calls attention to the cost of maintaining the Iowa lines, and the necessity for extensive improvements upon them, owing to their original poor construction, and recommends the negotiation of a new agreement which will permit this to be done. (These negotiations are now in progress.)

Referring to the use of steel rails, Mr. Clarke says: "It is now five years since steel rails were first laid on this road, and each year has demonstrated the advantages of steel over iron. From data of the cost of maintenance of 69 miles of track from Kensington to Gilman, laid with iron prior to 1872, and now laid with steel, it is a fact that it has cost \$505 per mile per annum less to maintain the track laid with steel than when laid with iron, the basis of cost of material being upon the prices of 1876. The year 1877 will show equally good results, with the track now laid with steel from Gilman to Champaign, from Du Quoin to Cairo and from Dixon to Dunleith."

Union Pacific.

President Dillon's report for the year ending Dec. 31, 1876, gives the following figures, but the detailed statements referred to have not yet been published. The mileage of the road is:

	Miles.
Omaha, Neb., to Ogden, Utah.....	1,030 5
Council Bluffs, Ia., to Omaha (bridge and approaches).....	3.0
Ogden to junction with Central Pacific.....	5.0

Total..... 1,038.5

The equipment consists of 168 locomotives, 167 passenger

train cars and 3,060 freight cars.

The funded debt at the close of the last two years was as follows:

	1876.	1875.	Decrease.
First mortgage, 6 per cent., gold.....	\$27,232,000	\$27,232,000	\$0
Sinking fund bonds, 8 per cent.....	14,188,000	14,260,000	\$72,000
Income bonds, 10 per cent.....	1,000	65,000	64,000
Land-grant bonds, 7 per cent.....	7,404,000	7,693,000	289,000
Omaha Bridge bonds, 8 per cent., gold.....	2,279,000	2,330,000	51,000
Total.....	\$51,104,000	\$51,519,000	\$415,000

The total funded debt (which does not include the Government subsidy) is \$49,209 per mile owned. Besides the decrease in funded debt, there was an increase of \$533,573.96 in floating assets. The annual interest charge is \$3,496,660, of which \$1,816,240 is payable in gold.

The sales of land for the year were 125,905.21 acres for \$375,540.82, an average of \$2.98 1/2 per acre; total sales, 1,319,848.12 acres, at an average of \$4.32 1/2 per acre. The account with the Land Department up to the close of the year is as follows:

Land sales.....	\$5,711,892 84
Interest on contracts.....	412,759 96
Received on forfeited contracts.....	1,140 94
Total.....	\$6,125,793 74

Expenses of Land Department..... \$721,897 46

Taxes..... 432,502 63

Surplus..... \$4,971,083 75

The whole issue of land-grant bonds was \$10,400,000, of which \$2,996,000 have been redeemed, leaving \$7,404,000 outstanding. The company has on hand in this fund \$94,201 cash and \$3,182,934.74 in interest-bearing notes and contracts. There are still unsold 10,758,134 acres of land.

The earnings for the year (exclusive of Omaha Bridge) were as follows:

	1876.	1875.	Inc. or Dec.	P. c.
Gross earnings.....	\$12,866,858 84	\$11,993,832 09	Inc.	\$873,026 75 7.4
Working exp'n's.....	5,268,211 20	4,362,047 95	Inc.	288,163 25 5.7

Net earnings..... \$7,618,647 64

Gross earn. per mile..... 12,446 06

Net earn. per mile..... 12,582 65

Inc. 862 41 7.4

Per cent. of expa..... 40.88

41.54

Inc. 886 06 8.7

0.66 1.6

The report says: "By reference to statements herewith submitted, it will be seen that the passenger earnings decreased during the year \$38,411.51, being 0.57 per cent., and the freight earnings increased \$662,611.23, being 9.98 per cent. "The Government business included in the above shows an increase in passengers of \$47,371.13, being 21.16 per cent., and an increase in freight of \$139,791.52 being 59.59 per cent. The mail earnings were \$574,139, the amount being ascertained in accordance with the contract between the company and the Government, under a reweighing made in February last."

Expenditures for construction were \$105,959.31, the chief items being \$42,860 for the general office building at Omaha, and \$40,060.87 for four new locomotives. There were used in renewals 2,022 tons steel rails, 10,914 tons re-rolled iron rails, 416,747 pine and 76,991 hardwood ties. The new iron bridge at Dale Creek, the most important on the road, was completed last summer at a cost of \$39,450.

The report says: "The rolling mill at Laramie has been in operation during the last year, and has re-rolled 10,914 tons of rails, at the contract price of \$18.50 per ton.

"The contract with Mr. Royal M. Bassett having been ter-

minated by agreement, the operating of the mill will hereafter be controlled by the company.

The mining business of the districts tributary to the road is said to be very promising, and the Black Hills are expected to attract a large increase of population this year. The company's coal mines have increased satisfactorily, the sales to the public increasing. The production of these mines has been:

	1876.	1875.	Inc. or Dec.	P. c.
Tons coal mined.....	264,771	208,222	Inc...	56,549 27.2
Cost of mining ...	\$375,520 56	\$391,885 10	Dec...	\$16,364 54 4.2
Cost per ton.....	1 42	1 88	Dec...	0 46 24.5

"The decrease of 46 cents per ton in the cost of mining has resulted in a net saving to the company, on last year's operations, of \$121,792.82. The use of Chinese labor on the road and in the mines has been continued, and proves as satisfactory as heretofore."

The opening of the Omaha & Republican Valley is noted, as giving the company better access to the traffic south of the Platte, and a proposed extension of it would open large tracts of the company's land. A branch to the Black Hills is recommended as desirable, and 100 miles of it should be built this year.

Chicago & Alton.

This company, during the year ending Dec. 31, 1876, worked the following lines:

	Main track.	Second track.	Sidings.	Total.
Main Line, Chicago to Joliet (leased).....	37.20	36.20	18.20	91.60
Main Line, Joliet to East St. Louis.....	243.50	30.50	53.05	327.05
Dwight to Washington and branch to Leavenworth.....	79.80	....	6.71	86.51
Roadhouse to Louisiana.....	38.10	....	3.60	41.70
Coal Branch.....	3.98	....	2.36	6.34
Chicago & Illinois River (leased).....	23.86	....	1.60	25.46
St. Louis, Jacksonville & Chicago (leased).....	150.60	....	12.64	163.24
Louisiana & Missouri River (leased).....	100.80	....	9.40	110.20
Total.....	677.54	66.70	107.68	851.92

Being in all 965.38 miles owned and 312.46 leased. The road owned was increased during the year by the 3.98 miles of the Coal Branch and that leased by the 23.86 miles of the Chicago & Illinois River, the two forming a loop line from Wilmington to Joliet. There was an increase of 12.72 miles second track, all between Joliet and Chicago, and of 6.64 miles of sidings. There are on the company's lines 136 stations, 116 in Illinois and 20 in Missouri.

The equipment consists of 156 engines, of which 147 burn coal and wood; 95 passenger train cars and 3,080 freight cars. There are 94 passenger train cars and 43 engines equipped with the Westinghouse automatic air-brake, nine of the engines having driving-wheel brakes.

The outstanding securities at the close of the year were as follows:

Preferred stock.....	\$2,425,400
Common stock.....	10,065,300
Convertible scrip.....	100
Total.....	\$12,490,800
Funded debt.....	8,629,850

Total stock and debt.....\$21,120,650

The stock was increased by \$127,600 and the funded debt by \$486,650 during the year. Of the funded debt \$4,379,850 consolidated bonds bear 6 per cent. interest, the rest 7 per cent. There is no floating debt apart from the usual current balances. The report says: "In pursuance of the terms under which the several leased lines are held and operated, there has been expended upon them for improvements and additions an aggregate sum amounting to about \$4,600,000, which, deducted from the total amount of stock and bonds above stated, leaves a balance or \$16,520,650, represented by the lines of railway and other property owned by your company, and by leasehold interests in other lines above designated. The sum last named is equal to about \$38,420 for each mile of main track owned by your company."

The work done was as follows:

	1876.	1875.	Inc. or Dec.	P. c.
Passenger train mileage.....	924,398	945,960	Dec.	21,562 2.3
Freight train mileage.....	1,837,057	1,362,023	Inc.	475,034 12.9

Total revenue train mileage.....2,461,455
2,307,973 Inc. 153,482 6.6
Mileage of passenger train cars.....4,117,940
4,270,694 Dec. 152,754 3.6
Mileage of freight cars.....34,962,381
27,840,615 Inc. 6,421,766 23.1
Passengers carried.....873,873
862,264 Inc. 11,609 1.3
Passenger mileage.....41,231,777
39,913,851 Inc. 1,317,926 3.3
Tons freight carried.....1,818,235
1,645,802 Inc. 172,433 17.6
Tonnage mileage.....217,835,161
168,923,879 Inc. 48,911,282 29.0

The tons carried and tonnage mileage do not include company freight; 85.50 per cent. of the tons and 94.32 per cent. of the passengers carried were local. The number of pieces of baggage checked was 256,380 in 1876 and 239,649 in 1875. The chief items of freight were 606,375 tons coal; 11,360,125 bushels corn; 3,173,515 bushels other grain; 80,645,390 feet lumber; 274,599 cattle; 387,569 hogs and 33,200 sheep. The only marked increases were about 130 per cent. in corn and 45 per cent. in cattle. The mileage of empty freight cars was 31,192 per cent. of the whole. During the year 89,779 passengers and 819,472 tons freight were carried to and 102,421 passengers and 175,107 tons freight from Chicago; 72,574 passengers and 166,326 tons freight to and 71,785 passengers and 149,068 tons freight from St. Louis. The total mileage of engines, including switching and service trains, was 3,813,586 miles; and the average cost 19.24 cents per mile.

Some averages of traffic were as follows:

	1876.	1875.	Inc. or Dec.	P. c.
Av'ge pass. train load, No.....	44,606	42,194	Inc...	2,412 5.7
Av'ge fr't train load, tons.....	141,722	124,024	Inc...	17,698 14.3
Tons per car mile, loaded cars.....	9.386	8.781	Inc...	0.605 6.3
Tons per car mile, all cars.....	6.441	6.131	Inc...	0.310 5.1
Av'ge earn. per mile, pass. trains.....	\$1.83154	\$1.83048	Inc...	\$0.00106 0.1
Av'ge earn. per mile, fr'ght trains.....	2.30398	2.30000	Dec...	0.00398 1.1
Av'ge earn. per mile, all trains.....	2.0152	2.0176	Dec...	0.0024 0.1
Av'ge exp. per train mile.....	1.0932	1.1283	Dec...	0.0351 3.1
Av'ge net earn. per train mile.....	0.9220	0.8893	Inc...	0.0327 3.7
Av'ge rate per pass. per mile, through.....	2.210 cts.	2.383 cts.	Dec...	0.173 cts. 14.4
Av'ge rate per pass. per mile, local.....	3.329 "	3.319 "	Inc...	0.010 " 0.3
Av'ge rate per pass. per mile, all.....	2.056 "	3.126 "	Dec...	0.170 " 5.4
Av'ge rate per ton per mile.....	1.626 "	1.878 "	Dec...	0.252 " 15.4

The company makes nearly all its own car wheels, and reports the average mileage of wheels removed from passenger cars during the year at 64,083 miles, and from freight cars at 118,278 miles.

There are now 384.70 miles of track laid with steel, of which 87.96 miles were laid in 1876. There was expended for improvements of the roads, \$397,073.27, the principal items being \$103,535.99 for new second track, and \$144,607.84 excess of cost of steel over iron rails.

Of the actual operating expenses of the year, 62 per cent. was paid for labor and personal service; 36 1/2 per cent. for supplies of various kinds purchased, and 1 1/2 per cent. for miscellaneous purposes.

The earnings for the year were as follows:

	1876.	1875.	Inc. or Dec.	P. c.
Passengers.....	\$1,218,890 91	\$1,252,688 77	Dec...	\$33,807 86 2.7
Freight.....	3,541,346 07	3,173,531 43	Inc...	367,814 64 11.6
Express.....	96,963 38	96,890 37	Inc...	73 01 0.07
Mails.....	97,969 00	96,192 36	Inc...	1,776 64 0.2
Miscellaneous.....	3,429 38	35,470 90	Dec...	\$32,041 52 90.3

Total.....	\$4,960,528 69	\$4,558,763 83	Inc...	\$401,764 86 8.8
Working exp's.....	2,691,061 11	2,604,125 34	Inc...	86,935 77 3.3
Net earnings.....	\$2,269,467 58	\$2,052,638 49	Inc...	\$216,829 09 10.6

Gross earnings, per mile.....	7,318 14	7,164 25	Inc...	153 89 2.1
Expenses, per mile.....	3,970 05	4,006 34	Dec...	36 29 0.9
Net earnings, per mile.....	3,348 09	3,157 91	Inc...	190 18 6.0
Per cent. of expenses.....	54 25	55 92	Dec...	1 67 3.0

The income account for the year may be summed up as follows:

Credit balance Jan. 1, 1876.....	\$126,585 53
Net earnings.....	2,269,467 58
Total.....	\$2,396,053 11

Interest on funded debt.....	\$590,916 29
St. Louis, Jacksonville & Chicago, rent.....	240,000 00
Joliet & Chicago, rent.....	132,355 00
Louisiana & Missouri River, rent.....	69,436 62
Taxes paid.....	113,229 38
Dividends (8 per cent.).....	988,652 00
Total.....	2,134,589 29

Balance, Jan. 1, 1877.....\$261,463 82

The report says: "There has been paid and charged in this account, during the year 1876, on account of taxes for 1873 and 1874, and sundry small amounts of bad debts accumulated since 1863, 'written out,' an aggregate amounting to \$238,366.95, leaving a balance of \$23,126.87."

"For the purpose of representing the remainder of accumulated net earnings from traffic, there should be added to the above balance the amount of a special fund appropriated temporarily from this account, to provide for working supplies. Adding that amount, \$500,000, the correct balance of this account is \$233,126.87."

"This balance was represented at the close of the year by supplies of various kinds in hand, inventoried at their present cash value, amounting to \$393,077.60, and by cash and bills, and accounts receivable, as shown by the general balance sheet, herewith reported."

"The general assets of the Company, at the close of the year, in addition to its railway and equipment, consisting of supplies, fuel, etc., on hand for future use, securities of the Mississippi River Bridge Company, bills and accounts receivable, stock, cash, and cash assets considered good in excess of bills and accounts payable, amount to about \$1,325,000, which may be considered the accumulated surplus, in which is included the balance to the credit of income account."

"The net earnings of the Mississippi River Bridge for the year, based upon rates corresponding with those charged on similar traffic over the bridges at Hannibal and Quincy, after deducting all expenses for operation and repairs, ordinary and extraordinary, amount to \$96,760.68, or 12 per cent. of its cost."

LOCOMOTIVE RETURNS, NOVEMBER, 1876.

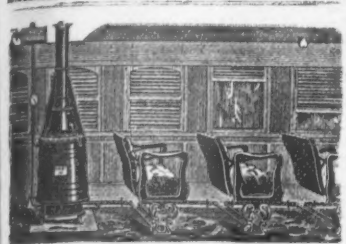
Master Mechanics of all American railroads are invited to send us their monthly reports for this table.

NAME OF ROAD.	Number of miles operated.....	Number of Locomotives in service.....	Mileage.		No. Miles run to		Average No. of freight cars hauled.....	Average cost per freight car per mile, cents.	Cost per Mile in Cents for					Av. cost of		
			Total.	Average per En- gine.....	Coal of Coal.	Kind of Coal.			Repairs.	Fuel.....	Stores.....	Miscellaneous.....	Engine, train, and wipers.....	Total.....	Coal, per ton of bushel.....	Wood, per cord.....
Allegheny Valley.....	259	228	95,846	3,489	35.40	23.40	21.30	0.900	7.78	3.76	0.64	.....	6.97	19.18	\$	\$
Atlantic & Great West'n (1st & 2d Divs.).....	228	83	206,568	3,489	39.87	.....	.....	.....	4.18	5.19	0.61	0.68	6.33	16.99	1.58	1.31
(Third & Fourth Divs.).....	197	48	123,619	2,575	39.87	.....	.....	.....	3.89	5.19	0.45	0.69	5.89	16.10	1.38	1.11
(Mahoning Division).....	86	53	114,301	2,157	39.87	21.99	.....	.....	3.70	5.19	0.39	0.62	5.93	15.72	1.33	1.14
Atlantic & Gulf.....	350	.....	53,212	.....	38.60	57.00	19.56	0.900	5.51	.....	.....	.....	10.30	.....	2.47	.....
Cairo & Vincennes.....	187	11	22,456	2,041	38.60	16.60	.....	.....	3.76	3.97	0.38	.....	5.83	13.94	1.60	.....
California Pacific.....	148	17	46,037	2,708	41.94	50.39	20.27	.....	4.10	18.07	0.62	0.46	7.41	30.66	8.00	8.00
Camden & Atlantic.....	67	13	18,768	1,448	63.30	14.00	.....	.....	3.34	7.00	0.94	.....	5.64	16.88	4.87	.....
Central Pacific (Western Division).....	178	105	131,736	2,385	39.87	16.71	.....	.....	7.62	18.81	0.76	0.54	9.14	36.87	7.90	8.00
(Vienna Division).....	187	13	38,763	2,697	61.89	22.17	.....	.....	7.63	12.14	0.59	0.09	7.73	28.18	7.80	8.00
(Lake Division).....	181	11	26,372	2,670	49.23	18.44	.....	.....	2.10	15.23	0.76	0.43	8.10	26.61	7.90	8.00
(Los Angeles, Yuma, San Diego and Wilu. Divs.).....	273	14	40,821	2,916	61.91	12.25	.....	.....	3.86	12.31	1.01	1.45	7.36	25.79	7.50	8.00
(Sacramento Division).....	120	42	106,873	2,545	.....	28.65	14.92	.....	8.70	17.45	0.81	0.44	9.33	36.73	.....	.....
(Oregon Division).....	161	7	72,073	3,153	.....	41.87	18.50	.....	7.65	12.03	0.67	0.35	8.33	29.03	.....	.....
(Truckee Division).....	205	30	76,961	2,665	35.52	27.93	15.98	.....	5.60	20.29	0.76	0.39	8.42	35.46	7.50	8.00
(Humboldt Division).....	237	25	73,724	2,949	38.09	16.28	.....	.....	6.76	19.69	0.71	0.35	7.85	35.36	7.50	8.00
(Salt Lake Division).....	183	28	71,716	2,660	36.11	13.96	.....	.....	5.79	20.77	0.94	0.37	9.30	35.77	7.90	8.00
Cleve., Col., Cin. & Ind. (Col'bus Div.).....	138	66	182,399	2,587	40.51	73.00	32.16	.....	2.41	4.75	0.56	0.66	5.66	14.06	1.75	2.50
(Cincinnati Div.).....	207	66	191,501	2,902	40.51	16.66	26.01	.....	3.41	4.05	0.65	1.35	5.15	17.76	1.75	2.50
(Cincinnati Div.).....	130	38	98,732	2,598	35.82	26.06	.....	.....	5.04	5.19	0.57	0.68	6.02	17.60	1.75	2.50
Cleveland & Mahoning Valley.....	41	6	14,651	2,442	35.64	21.83	.....	.....	1.83	7.18	0.41	1.48	8.17	19.07	1.81	2.84
Cleveland & Pittsburgh.....	199	75	143,798	1,917	42.42	19.49	16.60	0.989	3.32	3.54	0.58	2.77	7.05	17.26	1.21	2.35
Del., Lacka. & West. (Bloomsburg Div.).....	88	26	64,380	2,476	.....	31.22	.....	.....	3.97	.....	0.67	.....	5.91	10.55	.....	.....
(Bloomsburg Div.).....	98	29	50,232	1,733	35.94	16.41	16.20	1.098	4.69	4.45	0.73	1.76	7.03	18.65	1.00	1.60
Hannibal & St. Joseph.....	296	61	148,368	2,434	32.30	21.80	.....	.....	4.30	4.80	0.30	.....	6.40	16.00	1.50	2.50
Houston & Texas Central.....	499	67	169,692	2,533	41.60	29.60	13.65	.....	5.30	10.70	0.80	.....	8.20	25.20	4.25	4.25
Illinois Central (Chicago Div.).....	263	39	152,620	2,587	36.24	14.89	.....	.....	6.12	5.10	0.29	.....	6.19	17.71	1.75	4.00
(South Div.).....	331	34	81,304	2,391	35.75	13.90	16.00	.....	8.58	5.14	0.29	.....	5.93	19.94	1.75	4.00
(North Div.).....	225	47	84,797	1,804	28.07	10.76	15.84	.....	7.59	6.46	0.37	.....	6.26	20.68	1.75	4.00
(Iowa Div.).....	40	61	116,464	1,909	27.73	14.91	12.38	.....	4.94	11.09	0.29	.....	6.05	23.07	3.00	5.12
Jeffersonville, Madison & Indianapolis.....	226	83	92,112	2,142	47.09	39.87	14.12	1.630	3.30	6.16	0.56	1.78	6.32	18.12	2.00	2.35
Kansas Pacific, Main Line.....	673	40	177,798	2,692	2.66	12.63	.....	.....	5.03	11.24	0.43	.....	6.55	23.25	2.83	3.75
(including all branches).....	916	94	201,585	2,144	24.57	12.67	.....	.....	4.57	12.11	0.42	.....	6.74	23.84	2.99	3.99
Kansas City, St. Jo. & Council Bluffs.....	476	27	71,641	2,653	50.00	33.40	18.00	.....	5.50	6.40	0.60	.....	6.80	19.10	3.00	5.60
Lake Shore & Mich. So. (Buff. Div.).....	90	90	181,982	2,022	34.48	43.50	.....	.....	4.01	11.79	0.53	.....	6.25	22.89	.....	.....
(Buff. Div.).....	113	244	246,202	2,170	37.09	73.54	.....	.....	3.49	10.80	0.53	.....	5.73	19.16	3.25	4.35
(Toledo Div.).....	85	171	171,179	2,014	31.20	50.15	.....	.....	4.25	11.67	0.36	.....	5.70	20.57	3.45	4.08
(Mich. So. Div.).....	207	414	299,010	2,010	33.01	52.21	.....	.....	4.25	11.67	0.36	.....	6.36	22.44	4.25	4.35
Little Rock & Fort Smith.....	168	.....	19,758	.....	204.55	60.17	17.12	.....	2.22	3.70	0.46	.....	5.05	11.43	3.00	2.00
Marquette, Houghton & Ontonagon.....	88	21	71,334	1,035	44.81	23.88	.....	.....	2.22	11.80	0.60	.....	7.85	22.47	.....	.....
North'n Cent'l (Elm. & Canad'gus Div.).....	147	.....	389,812	2,874	34.09	.....	9.78	.....	4.70	10.10	1.20	.....	16.00	0.12	5.60	.....
Pennsylvania (New York Division).....	132	48	80,980	1,687	87.29	23.29	14.97	.....	3.80	6.00	0.90	.....	10.70	13.12	1.62	.....
(Amboy Division).....	48	.....	77,458	2,063	34.87	.....	10.67	.....	8.20	9.80	1.30	.....	19.30	.....	0.98	4.34
(Belvidere Division).....	196	106	544,585	2,779	28.22	12.40	.....	.....	2.10	5.20	0.80	.....	9.00	0.98	4.34	.....
(Philadelphia Division).....	104	34	346,363	3,321	27.80	.....	17.01	.....	5.70	6.30	1.00	.....	13.00	0.98	4.34	.....
(Mid. Division).....	76	123	156,045	2,653	22.68	.....	9.29	.....	4.10	4.40	0.60	.....	9.10	0.98	4.34	.....
(Pittsb'gh Div. E. End).....	82	32	65,714	2,054	24.41	.....	19.68	.....	5.30	5.90	0.60	.....	11.80	0.98	4.34	.....
(Pittsb'gh Div. West End).....	123	24	45,242	1,884	40.72	.....	29.94	.....	2.90	3.80	0.40	.....	7.10	0.98	4.34	.....
(Tyrone Division).....	82	6	12,429	2,072	35.29	.....	19.68	.....	3.70	4.20	0.50	.....	8.40	0.98	4.34	.....
(West Pennsylvania Div.).....	.....	.....	10,584	2,646	37.44	.....	19.53	.....	1.30	6.30	0.50	.....	7.10	0.98	4.34	.....
(Bedford Division).....	.....	.....	132	389,754	2,815	16.27	14.80	1.064	2.99	4.00	0.70	1.76	6.74	16.90	2.10	1.41
Pitts., Ft. Wayne & Chi. (Eastern Div.).....	280	115	304,370	2,547	33.56	.....	.....	.....	3.85	5.91	0.49	2.41	6.44	18.90	2.10	2.20
(Western Div.).....	197	39	96,708	4,801	41.45	12.74	17.37	1.044	4.69	6.80	0.74	2.31	6.94	20.72	2.68	2.60
(Pitts. Cin. & St. L. Div.).....	224	32	101,105	3,160	.....	41.80	18.80	.....	2.95	6.19	0.50	.....	6.85	16.55	.....	.....
St. Louis, I. M. & C. (Arkansas Div.).....	49	3	3,926	1,309	.....	61.34	20.55	.....	50.89	8.15	0.71	0.65	8.87	69.27	.....	.....
Stockton & Copperopolis.....	126	19	39,905	1,784	45.67	41.31	13.85	3.40	8.70	0.70	12.80	0.30	4.16
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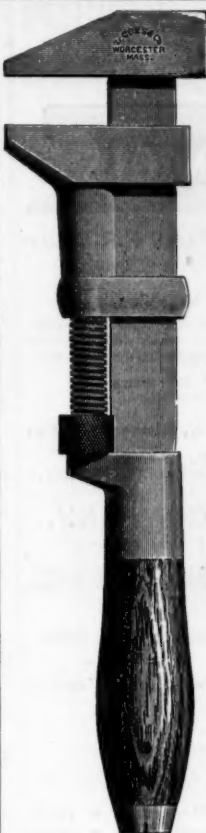
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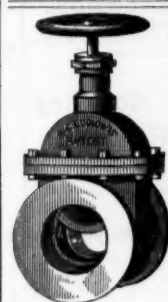
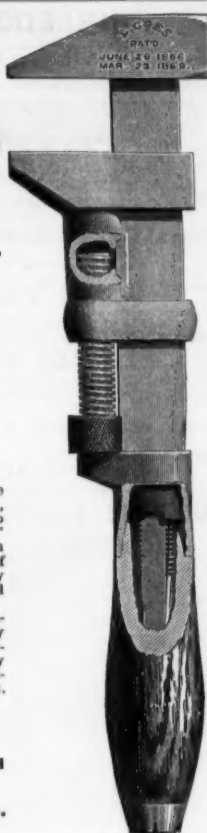


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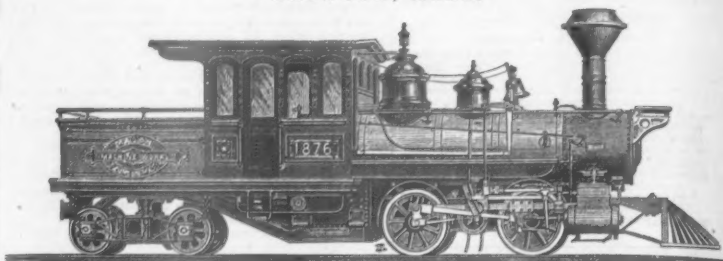
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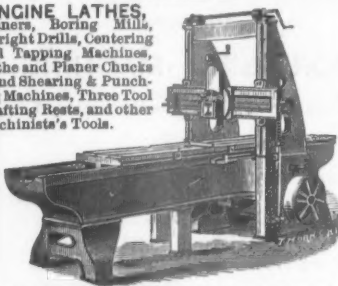
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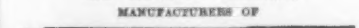
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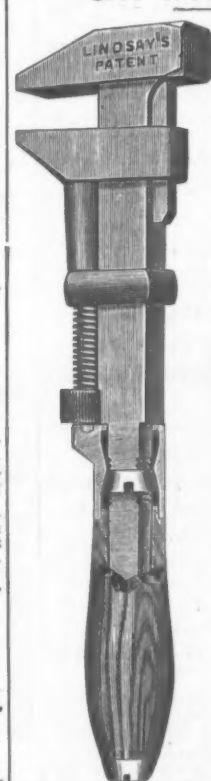


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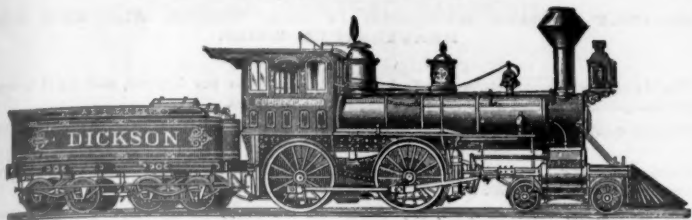
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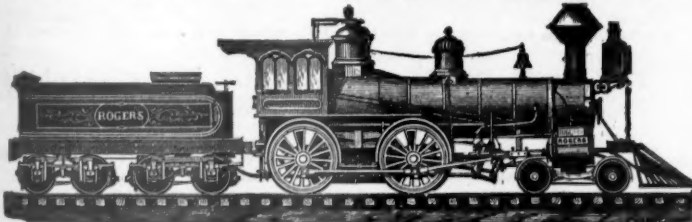
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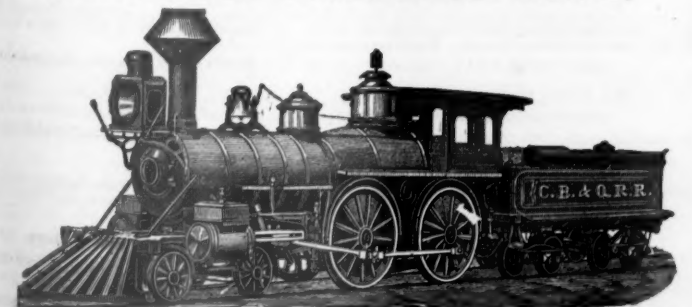
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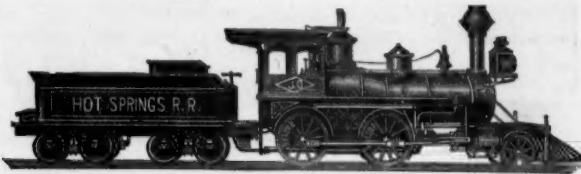
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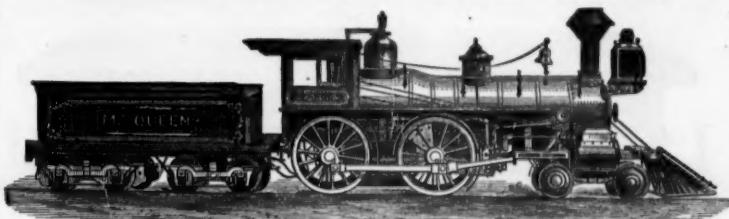
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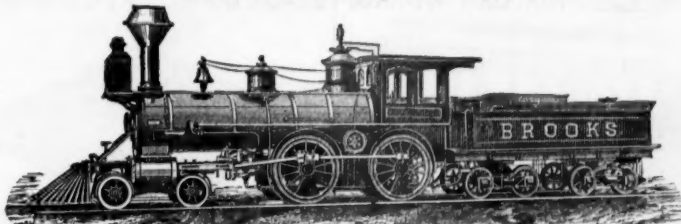
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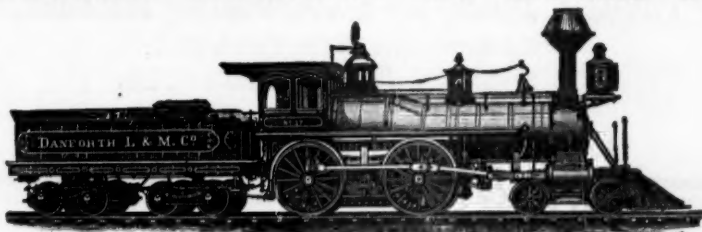
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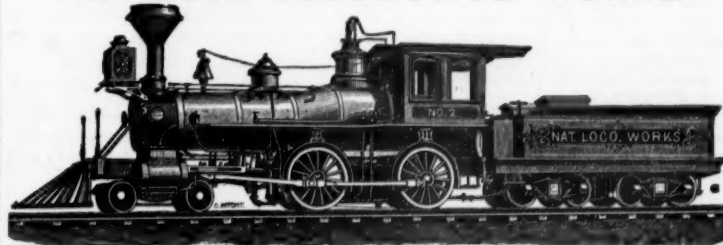
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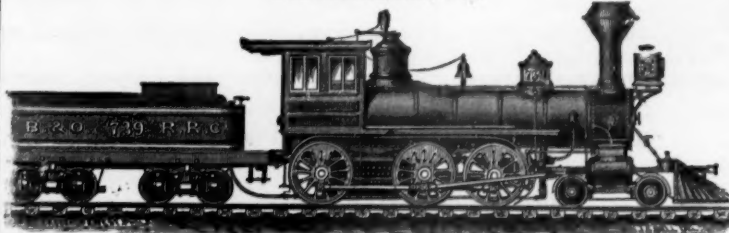


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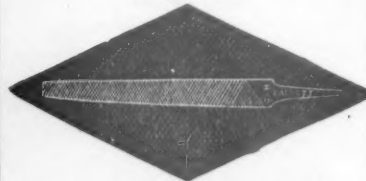
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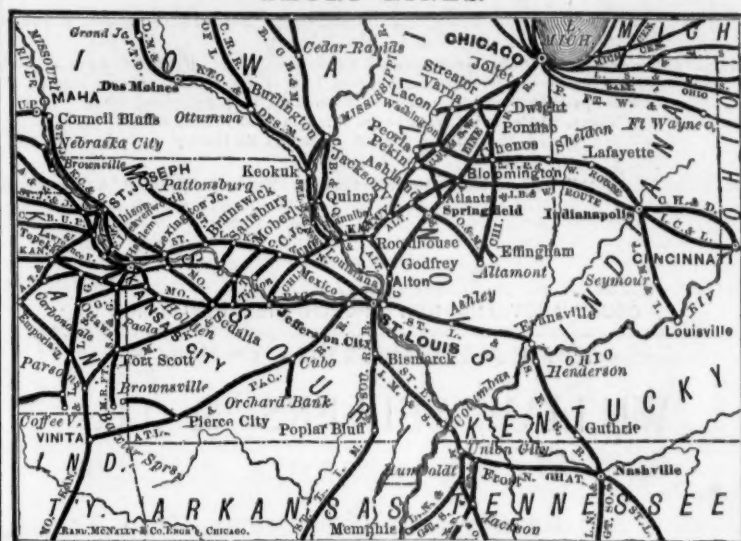
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9.30 A. M. DAY EXPRESS. Sundays Excepted. Arriving at Dubuque 7.00 P. M.; Waterloo, 12.05
A. M.; Fort Dodge, 5.35 A. M.; Sioux City, 12.32 P. M.

9.30 P. M. NIGHT EXPRESS. Sundays Excepted. Arriving at Dubuque 6.55 A. M.; Waterloo
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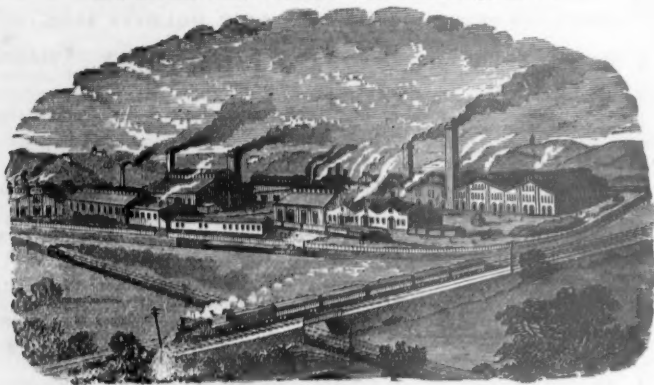
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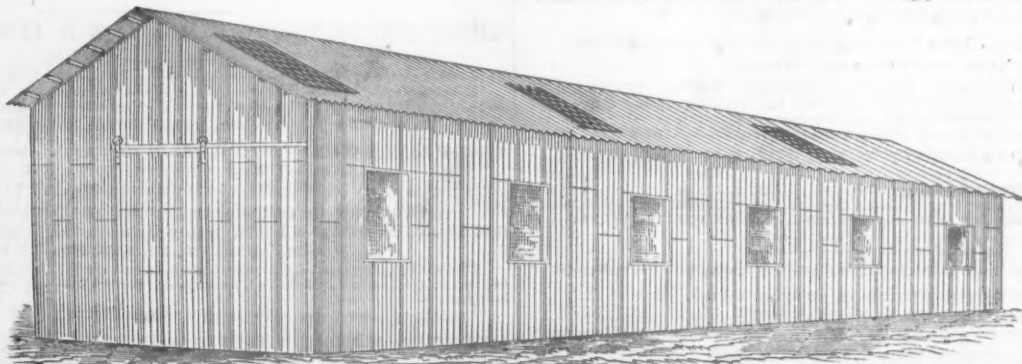
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